START

Superfund Technical Assessment and Response Team

- Region VIII





United States
Environmental Protection Agency

Contract No. 68-W5-0031

APPENDIX D and **APPENDIX E** (CD ROM)

APPENDIX D - Analytical Data and Validation Reports

APPENDIX E - Data Ram And Meteorological Monitoring Data **Files (Cd Rom)**

FOR REMOVAL SUMMARY REPORT

VASQUEZ BOULEVARD AND I-70 SITE Denver, Colorado

TDD No. 9809-0014

DECEMBER 23, 1998



TOPSOIL ANALYTICAL RESULTS

CASE NARRATIVE November 19, 1998

Client:

URS Operating Services, Inc.

Project:

75.80914.00

Date Rec'd: 10/15/98

SDG#:

L20715

Lab Nos.:

L20715-01 through L20715-03

Three samples for this SDG were received on 10/15/98. The samples were received in good condition. These samples were then logged into ACZ's LIMS as projects L20715.

The samples for this SDG were analyzed for the parameters outlined in the scope of work attached with the Chain of Custody documentation. The list contained inorganic parameters.

The data package is separated into four (4) sections as follows:

- Invoice and Case Narrative
- Inorganic Analytical Reports
- QC Summaries
- Chain of Custody Documentation

Items of note for this project:

This set of samples meets ACZ's data quality objectives.

If you have any questions please do not hesitate to call me at (800) 334-5493.

Scott Gustin, Project Manager



ACZ Laboratories, Inc.
30400 Downhill Drive

Steamboat Springs, CO 80487

(800) 334-5493

URS Operating Services, Inc. 1099 18th Street Suite 710 Denver, CO 80202-1908

Karen Kuoppula

Lab Sample ID: L20715-01
Client Sample ID: VB-A1-1
Client Project ID: 75.80914.00
ACZ Report ID: RG79615

Date Sampled: 10/13/98 14:00

Date Received: 10/15/98
Date Reported: 10/22/98

Sample Matrix: Soil

Meta	is Aı	nalv	/sis

Parameter (2)	EPA Method			· Result ?	Oua	A. Units	MDL	POL.	Date →	Analyst
Aluminum, total (3051)	M6010B ICP			35400		mg/Kg	4	20	10/16/98	kr
Antimony, total (3051)	M7041 GFAA				U	mg/Kg	0.3	ı	10/17/98	jb
Arsenic, total (3051)	M7060 GFAA			6.5		mg/Kg	0.6	3	10/16/98	jb
Barium, total (3051)	M6010B ICP			244		mg/Kg	0.4	1	10/16/98	kr
Beryllium, total (3051)	M6010B ICP			1.0		mg/Kg	0.3	-1	10/16/98	kr
Cadmium, total (3051)	M7131 GFAA			0.52		mg/Kg	0.06	0.3	10/17/98	jb
Calcium, total (3051)	M6010B ICP			26700		mg/Kg	30	100	10/16/98	kr
Chromium, total (3051)	M6010B ICP			22		mg/Kg	1	6	10/16/98	kr
Cobalt, total (3051)	M6010B ICP			8		mg/Kg	1	6	10/16/98	kr
Copper, total (3051)	M6010B ICP	• '		18		mg/Kg	1	6	10/16/98	kr
fron, total (3051)	M6010B ICP			21300		mg/Kg	ı	6	10/16/98	kr
Lead, total (3051)	M7421 GFAA			16.8		mg/Kg	0.5	3	10/16/98	jb
Magnesium. total (3051)	M6010B ICP			4880		mg/Kg	30	100	10/16/98	kr
Manganese, total (3051)	M6010B ICP	•	•	382	•	mg/Kg	0.6	1	10/16/98	kr
Mercury, total	M7471 CVAA			0.07	В	mg/Kg	0.02	0.1	10/20/98	SS
Nickel, total (3051)	M6010B ICP			22		mg/Kg	1	6	10/16/98	kr
Potassium, extractable (AB-DTPA	A) M6010B ICP			320		_ mg/Kg	20	50	10/20/98	gg
Potassium, total (3051)	M6010B ICP			3650		mg/Kg	40	100	10/16/98	kr
Selenium, total (3051)	M7742 Modified	, AA-Hydride		0.6		mg/Kg	0.1	0.6	10/21/98	kr
Silver, total (3051)	M7761 GFAA			0.32		mg/Kg	0.06	0.3	10/16/98	jb
Sodium, total (3051)	M6010B ICP			200		mg/Kg	40	100	10/16/98	kr
Thallium, total (3051)	M7841 GFAA				U	mg/Kg	0.3	1	10/17/98	jb
/anadium. total (3051)	M6010B ICP	•		37.0		mg/Kg	0.6	3	10/17/98	kr
Zinc, total (3051)	M6010B ICP		÷	91		mg/Kg	1	6	10/16/98	kr

Soil Analysis

Parameter	EPA Method	ाः Result जर्म	Qual 🚃 Units 🗆	MDL	≂PQL:	Date AA	nalyst
Conductivity @25C	M120.1 - Meter, w/ Saturated Paste Prep	1.820	mmhos/cm	100.0	0.01	10/16/98	cc
Organic Matter	USDA No.60 - Method 24	2.71	%	0.01	0.1	10/16/98	sw
pH, Saturated Paste	USDA No. 60 (21A)	7.8	units	. 0.1	0.1	10/16/98	cc
Sieve- 2000 um (2.0 mm)	ASA No.9 15-4.2.2	73.0	% Passing	0.1	0.5	10/16/98	cjv
Sieve-22400 um (7/8")	ASA No.9 15-4.2.2	100	% Passing	0.1	0.5	10/16/98	cjv
Solids, Percent	CLPSOW390, PART F, D-98	, 78.2	%	0.1	0.5	10/15/98	vv



laorganic Qualifiers (based on EPA CLP 3/90)

U = Analyte was analyzed for but not detected at the indicated MDL

B = Analyte concentration detected at a value between MDL and PQL

PQL = Practical Quantitation Limit

KVPoulson

 ACZ Laboratories, Inc.
 Lab Sample ID: L20715-01

 30400 Downhill Drive
 Client Sample ID: VB-A1-1

 Steamboat Springs, CO 80487
 Client Project ID: 75.80914.00

 (800) 334-5493
 ACZ Report ID: RG79615

 URS Operating Services, Inc.
 Date Sampled: 10/13/98 14:00

 1099 18th Street Suite 710
 Date Received: 10/15/98

 Denver, CO 80202-1908
 Date Reported: 10/22/98

 Karen Kuoppula
 Date Reported: 10/22/98

Sample Matrix: Soil

Texture by Hydrometer	ASTM D 422 Hydrometer	<u> </u>					
Clay		20	. %	1	5	10/16/98	CC
Sand		56	%	i	5	10/16/98	cc
Silt		24	%	. 1	5	10/16/98	cc
Texture Classification		SL-SCL				10/16/98	cc

Soil Preparation

Parameter Parame			Result & Qual - Units MDL - PQL Date - A	nalyst
AB-DPTA Extraction	ASA No. 9, 3-5.2.3		10/16/98	cjv
Air Dry at 34 Degrees C	USDA No. 1, 1972		10/15/98	VV
Digestion - Microwave	M3051, HNO3		10/16/98	cjv
Saturated Paste Extraction	USDA No. 60 (2)		10/16/98	cjv
Water Extraction	ASA No. 9 10-2.3.2		10/16/98	cjv

Wet Chemistry

Parameter 1	EPA Method	Result 📆 🕻	Qual (". Units 🚖	MDL	::PQL	Date : A	nalyst
Nitrate as N. soluble (Water)	Calculation: NO3NO2 minus NO2	28.2	mg/Kg	0.5	3	10/22/98	calc
Nitrate/Nitrite as N. soluble (Water)	M353.2 - Automated Cadmium Reduction	32.9	mg/Kg	0.5	3	10/17/98	55
Nitrite as N. soluble (Water)	M353.2 - Automated Cadmium Reduction	4.69	mg/Kg	0.05	0.3	10/17/98	SS
Phosphorus. extractable (AB-DTPA)	M365.1 - Automated Ascorbic Acid	23	mg/Kg	. 1	5	10/17/98	SS

Note: The Antimony, Cadmium and Silver analyses were performed using method of standard additions. The Silver value is estimated due to matrix interferences.

loorganie Qualifiers (based on EPA CLP 3/90)

U = Analyte was analyzed for but not detected at the indicated MDL

B = Analyte concentration detected at a value between MDL and PQL

PQL = Practical Quantitation Limit



ACZ Laboratories, Inc. 30400 Downhill Drive Steamboat Springs, CO 80487 (800) 334-5493

URS Operating Services, Inc. 1099 18th Street Suite 710 Denver, CO 80202-1908 Karen Kuoppula Lab Sample ID: L20715-02
Client Sample ID: VB-A1-2
Client Project ID: 75.80914.00
ACZ Report ID: RG79616

Date Sampled: 10/13/98 14:08
Date Received: 10/15/98
Date Reported: 10/22/98

Sample Matrix: Soil

Metals Analysis

Metals Analysis								
Parameter :	EPA Method	Result	💯 Qual	W. Units	" MDL	PQL	Date A	ualyst
Aluminum, total (3051)	M6010B ICP	33800		mg/Kg	4	20	10/16/98	kr
Antimony, total (3051)	M7041 GFAA		U	mg/Kg	0.5	3	10/17/98	jb
Arsenic, total (3051)	M7060 GFAA	5.4		mg/Kg	0.6	3	10/16/98	jb
Barium, total (3051)	M6010B ICP	288		mg/Kg	0.4	1	10/16/98	kr
Beryllium, total (3051)	M6010B ICP	1.1		mg/Kg	0.3	.1	10/16/98	kr
Cadmium, total (3051)	M7131 GFAA	0.58		mg/Kg	0.06	0.3	10/17/98	jb
Calcium, total (3051)	M6010B ICP	20700		mg/Kg	30	100	10/16/98	kr
Chromium, total (3051)	M6010B ICP	20	•	mg/Kg	1	6	10/16/98	kr
Cobalt, total (3051)	M6010B ICP	10 .		mg/Kg	1	6	10/16/98	kr
Copper, total (3051)	M6010B ICP	71		mg/Kg	1	6	10/16/98	kr
fron. total (3051)	M6010B ICP	22200		mg/Kg	1 .	6	10/16/98	kr
Lead. total (3051)	M7421 GFAA	21.8		mg/Kg	0.6	3	10/16/98	jb
Magnesium, total (3051)	M6010B ICP	5060		mg/Kg	30	100	10/16/98	kr
Manganese, total (3051)	M6010B ICP	. 1320		mg/Kg	0.6	1	10/16/98	kr
Mercury, total	M7471 CVAA	0.04	В	mg/Kg	0.03	0.1	10/20/98	SS
Nickel, total (3051)	M6010B ICP	17		mg/Kg	1	6	10/16/98	kr
Potassium, extractable (AB-DTPA)	M6010B ICP	420		mg/Kg	20	50	10/20/98	g g
Potassium, total (3051)	M6010B ICP	4050		mg/Kg	40	100	10/16/98	kr
Selenium, total (3051)	M7742 Modified, AA-Hydr	ide 0.7		mg/Kg	0.1	0.6	10/21/98	kr
Silver, total (3051)	MI//OI GFAA	0.7		mg/Kg	0.1	0.6	10/16/98	jb
Sodium, total (3051)	M6010B ICP	430		mg/Kg	40	100	10/16/98	kr
Thallium, total (3051)	M7841 GFAA		U	mg/Kg	0.5	3	10/17/98	jb
Vanadium, total (3051)	M6010B ICP	46.8		mg/Kg	0.6	3	10/17/98	kr
Zinc, total (3051)	M6010B ICP	116		mg/Kg	1	6	10/16/98	kr

Soil Analysis

Parameters for	EPA Method	- Result 😤	Qual Units	MDL	- PQL	r≠ Date , 3 A	nalvst
Conductivity @25C	M120.1 - Meter, w/ Saturated Paste Prep	1.300			0.01	10/16/98	CC
Organic Matter	USDA No.60 - Method 24	5.09	. %	0.01	0.1	10/16/98	\$W
pH, Saturated Paste	USDA No. 60 (21A)	7.7	units	0.1	0.1	10/16/98	cc
Sieve- 2000 um (2.0 mm)	ASA No.9 15-4.2.2	64.5	% Passing	0.1	0.5	10/16/98	cjv
Sieve-22400 um (7/8")	ASA No.9 15-4.2.2	100	% Passing	0.1	0.5	10/16/98	cjv
Solids, Percent	CLPSOW390, PART F, D-98	77.9	%	0.1	0.5	10/15/98	vv

Inorganic Qualifiers (based on EPA CLP 3/90)

U = Analyte was analyzed for but not detected at the indicated MDL

B = Analyte concentration detected at a value between MDL and PQL

PQL = Practical Quantitation Limit

_____KVPgerlsen

 ACZ Laboratories, Inc.
 Lab Sample ID: L20715-02

 30400 Downhill Drive
 Client Sample ID: VB-A1-2

 Steamboat Springs, CO 80487
 Client Project ID: 75.80914.00

 (800) 334-5493
 ACZ Report ID: RG79616

URS Operating Services, Inc.

1099 18th Street Suite 710

Date Received: 10/13/98 14:08

Denver, CO 80202-1908

Date Reported: 10/22/98

Karen Kuoppula

Sample Matrix: Soil

Texture by Hydrometer	ASTM D 422 Hydrometer						
Clay		6	%	I	5	10/16/98	cc
Sand		81	%	1	5	10/16/98	cc
Silt		13	%	1	5	10/16/98	cc
Texture Classification	•	LS				10/16/98	cc

Soil Preparation

Parameter : De C	EPA Method	Result 🚓 Qual 🚌	Result @ Qual on Units @MDL@PQL # 2 Date & A					
AB-DPTA Extraction	ASA No. 9, 3-5.2.3		10/16/98	cjv				
Air Dry at 34 Degrees C	USDA No. 1, 1972		10/15/98	w				
Digestion - Microwave	M3051, HNO3	•	10/16/98	cjv				
Saturated Paste Extraction	USDA No. 60 (2)		10/16/98	cjv				
Water Extraction	ASA No. 9 10-2.3.2 `		10/16/98	cjv				

Wet Chemistry

Tarameter	EPA Method	· Result 🛣 🕻	ual 🧺 Units 🕄	MDL	;; PQL	N. Date NA	nalyst
Nitrate as N. soluble (Water)	Calculation: NO3NO2 minus NO2	11,5	mg/Kg	0.1	0.5	10/22/98	calc
Nitrate/Nitrite as N. soluble (Water)	M353.2 - Automated Cadmium Reduction	12.8	mg/Kg	0.1	0.5	10/17/98	\$\$
Nitrite as N. soluble (Water)	M353.2 - Automated Cadmium Reduction	1.31	mg/Kg	0.05	0.3	10/17/98	SS
Phosphorus, extractable (AB-DTPA)	M365.1 - Automated Ascorbic Acid	43	mg/Kg	. 1	5	10/17/98	\$\$

Note: The Antimony, Cadmium and Silver analyses were performed using method of standard additions. The Silver value is estimated due to matrix interferences.

Inorganic Qualifiers (based on EPA CLP 3/90)

U = Analyte was analyzed for but not detected at the indicated MDL

B = Analyte concentration detected at a value between MDL and PQL

PQL = Practical Quantitation Limit



30400 Downhill Drive Steamboat Springs, CO 80487 (800) 334-5493

Fax: (970) 879-2216

QC Report ID: QC2046-D

ACZ Project ID: L20715

REPORT TO:

Karen Kuoppula URS Operating Services, Inc. 1099 18th Street Suite 710 Denver, CO 80202-1908 Monday, November 16, 1998

Bradley W. Craig, Quality Assurance Officer

Scott Gustin, Project Manager

Date

Date

REPQC001.07.97.03



ACZ Laboratories, Inc. 30400 Downhill Drive Steamboat Springs, CO 80487

(800) 334-5493

URS Operating Services, Inc. 1099 18th Street Suite 710 Denver, CO 80202-1908

Kent Alexander

Lab Sample ID: L20987-01 Client Sample ID: VB-SP-IVS

Client Sample ID: VB-SP-1VS
Client Project ID: 75.80914.00
ACZ Report ID: RG81096

Date Sampled: 10/23/98 15:10

Date Received: 11/4/98
Date Reported: 11/12/98

Sample Matrix: Soil

Soil Analysis

Parameteres	EPA Method	ः Result 🎉	Qual 🗱 Units 🎉	MDL	PQL	Date A	nalyst
Conductivity @25C	M120.1 - Meter, w/ Saturated Paste Prep	2.380	mmhos/cm	0.001	0.01	11/9/98	٧v
Organic Matter	USDA No.60 - Method 24	4.03	%	0.01	0.1	11/9/98	as
pH, Saturated Paste	U\$DA,No. 60 (21A)	7.7	units	0.1	0.1	11/9/98	vv
Sieve- 2000 um (2.0 mm)	ASA No.9 15-4.2.2	56.8	% Passing	1.0	0.5	11/6/98	VV
Sieve-22400 um (7/8")	ASA No.9 15-4.2.2	100	% Passing	0.1	0.5	11/6/98	vv
Solids, Percent	CLPSOW390, PART F, D-98	83.2	%	0.1	0.5	11/5/98	as
Texture by Hydrometer	ASTM D 422 Hydrometer						
Clay		10	%	1	5	11/11/98	as
Sand	•	53	%	1	5 .	11/11/98	as
Silt		37	%	1	5	11/11/98	as
Texture Classification		SL/L				11/11/98	as

Soil Preparation

Parameter 3	EPA Method	Result Qual : Units St MDL PQL Date Analys					
AB-DPTA Extraction	ASA No. 9, 3-5.2.3	11/9/98	VV				
Air Dry at 34 Degrees C	USDA No. 1, 1972	11/5/98	as				
Saturated Paste Extraction	USDA No. 60 (2)	11/9/98	vv				
Water Extraction	ASA No. 9 10-2.3.2	11/9/98	vv				

Wet Chemistry

Parameter 2	EPA Method *	Result 👯 Qu	nal 37 Units 🕫	MDL	; PQL	DateA	nalyst
Nitrate as N, soluble (Water)	Calculation: NO3NO2 minus NO2	42.0	mg/Kg	0.5	3	11/12/98	calc
Nitrate/Nitrite as N, soluble (Water)	M353.2 - Automated Cadmium Reduction	42.5	mg/Kg	0.5	3	11/10/98	SS
Nitrite as N. soluble (Water)	M353.2 - Automated Cadmium Reduction	0.48	mg/Kg	0.05	0.3	11/10/98	SS
Phosphorus, extractable (AB-DTPA)	M365.1 - Automated Ascorbic Acid	16	mg/Kg	I	5	11/12/98	SS

Note: Duplicate precision for Conductivity and Nitrate/Nitrite exceeds ACZ's QC limit.

Inorganic Qualifiers (based on EPA CLP 3/90)

U = Analyte was analyzed for but not detected at the indicated MDL

B = Analyte concentration detected at a value between MDL and PQL

PQL = Practical Quantitation Limit



ACZ Laboratories, Inc. 30400 Downhill Drive Steamboat Springs, CO 80487 (800) 334-5493

URS Operating Services, Inc.

1099 18th Street Suite 710

Denver, CO 80202-1908 Kent Alexander Lab Sample ID: L20987-02
Client Sample ID: VB-SP-1S
Client Project ID: 75.80914.00
ACZ Report ID: RG81097

Date Sampled: 10/23/98 15:15

Date Received: 11/4/98

Date Reported: 11/12/98

Sample Matrix: Soil

Soil Analysis

Parameter er sale :	EPA Method	Result	Qual := Units	MDLE	PQL:	Date A	nalyst
Conductivity @25C	M120.1 - Meter, w/ Saturated Paste Prep	2.610	mmhos/cm	0.001	0.01	11/9/98	vv
Organic Matter	USDA No.60 - Method 24	3.85	%	0.01	0.1	11/9/98	as
pH, Saturated Paste	USDA No. 60 (21A)	7.7	units	0.1	0.1	11/9/98	VV
Sieve- 2000 um (2.0 mm)	ASA No.9 15-4.2.2	99.7	% Passing	0.1	0.5	11/6/98	vv
Sieve-22400 um (7/8")	ASA No.9 15-4.2.2	100	% Passing	0.1	0.5	11/6/98	vv
Solids, Percent	CLPSOW390, PART F, D-98	81.5	%	0.1	0.5	11/5/98	as
Texture by Hydrometer	ASTM D 422 Hydrometer						
Clay		10	%	1	5	11/11/98	as
Sand		55	%	1	5	11/11/98	as
Silt		35	%	1	5	11/11/98	as
Texture Classification		SL				11/11/98	as

Soil Preparation

Parameter	EPA Method	Result Qual Units MDL PQL Date An	alyst
AB-DPTA Extraction	ASA No. 9, 3-5.2.3	11/9/98	VV
Air Dry at 34 Degrees C	USDA No. 1, 1972	11/5/98	as
Saturated Paste Extraction	USDA No. 60 (2)	11/9/98	vv
Water Extraction	ASA No. 9 10-2.3.2	11/9/98	vv

Wet Chemistry

Parameter	EPA Method	Result \$ Q	ual = "Units "	MDL	*:PQL	22 Date : A	nalyst
Nitrate as N, soluble (Water)	Calculation: NO3NO2 minus NO2	72.0	mg/Kg	0.5	3	11/12/98	calc
Nitrate/Nitrite as N, soluble (Water)	M353.2 - Automated Cadmium Reduction	72.5	mg/Kg	0.5	3	11/10/98	SS
Nitrite as N. soluble (Water)	M353.2 - Automated Cadmium Reduction	0.50	mg/Kg	0.05	0.3	11/10/98	SS
Phosphorus. extractable (AB-DTPA)	M365.1 - Automated Ascorbic Acid	18	mg/Kg	1	5	11/12/98	SS

Note: Duplicate precision for Conductivity and Nitrate/Nitrite exceeds ACZ's QC limit.

Inorganic Oraliners (based on EPA CLP 3/90)

U = Analyte was analyzed for but not detected at the indicated MDL

B = Analyte concentration detected at a value between MDL and PQL

PQL = Practical Quantitation Limit

REPIN101c.01.96.01

Vice President of Operations: Ralph Poulsen

Page 1 of 1



ACZ Laboratories, Inc. 30400 Downhill Drive Steamboat Springs, CO 80487

(800) 334-5493

URS Operating Services, Inc. 1099 18th Street Suite 710 Denver, CO 80202-1908 Karen Kuoppula Lab Sample ID: L20861-01 Client Sample ID: VB-SP-1US

Client Project ID: Vasquez Blvd ACZ Report ID: RG80219

Date Sampled: 10/23/98 15:10
Date Received: 10/24/98
Date Reported: 10/29/98

Sample Matrix: Soil

Meta	ıc	Ang	м	veie
****		/ TIII	8	, ,,,

Metals Alialysis							<u>'</u>	
Parameter	EPA Method Strate in an in the		Qual	Units >	₹MDL	≝ PQL	The Date TA	nalyst
Aluminum, total (3051)	M6010B ICP	26700		mg/Kg	4	20 ·	10/28/98	gg
Antimony, total (3051)	M7041 GFAA		U	mg/Kg	0.2	1	10/28/98	bg
Arsenic, total (3051)	M7060 GFAA	5.9		mg/Kg	0.5	2	10/27/98	jb
Barium, total (3051)	M6010B ICP	192		mg/Kg	0.4	1	10/28/98	gg
Beryllium, total (3051)	M6010B ICP	0.8	В	mg/Kg	0.2	i	10/28/98	gg
Cadmium, total (3051)	M7131 GFAA	0.8		mg/Kg	0.1	0.6	10/28/98	bg
Calcium, total (3051)	M6010B ICP	21000		mg/Kg	20	100	10/28/98	gg
Chromium, total (3051)	M6010B ICP	. 18		mg/Kg	1	6	10/28/98	gg
Cobalt, total (3051)	M6010B ICP	6		mg/Kg	1	6	10/28/98	gg
Copper, total (3051)	M6010B ICP	26		mg/Kg	1	6	10/28/98	gg
Iron, total (3051)	M6010B ICP	17200		mg/Kg	1	6	10/28/98	gg
Lead, total (3051)	M7421 GFAA	23.0		mg/Kg	0.5	2	10/28/98	bg
Magnesium, total (3051)	M6010B ICP	4420		mg/Kg	20	100	10/28/98	gg
Manganese, total (3051)	M6010B ICP	⁻ 340		mg/Kg	0.6	1	10/28/98	gg
Mercury, total	M7471 CVAA	0.03	В	mg/Kg	0.02	0.1	10/28/98	bg
Nickel, total (3051)	M6010B ICP	18		mg/Kg	.1	6	10/28/98	gg
Potassium, total (3051)	M6010B ICP	3310	• •	mg/Kg	40	100	10/28/98	gg
Selenium, total (3051)	M7742 Modified, AA-Hydride	0.5	В	mg/Kg	0.1	0.6	10/28/98	bg
Silver, total (3051)	M7761 GFAA	0.29	В	mg/Kg	0.06	0.3	10/28/98	jb
Sodium, total (3051)	M6010B ICP	200		mg/Kg	40	100	10/28/98	gg
Thallium, total (3051)	M7841 GFAA	0.3	В	mg/Kg	0.2	1	10/28/98	bg
Vanadium, total (3051)	M6010B ICP	31.2		mg/Kg	0.6	3	10/28/98	gg
Zinc, total (3051)	M6010B ICP	93 .		mg/Kg	1	6	10/28/98	gg

Soil Analysis

Parameter :	EPA Method	Result - Qual	- Units	MDL	PQL-	· *Date · · · A	nalyst
Solids, Percent	CLPSOW390, PART F, D-98	83.6	%	0.1	0.5	10/27/98	CC

Soil Preparation

Parameter 7	EPA Method	Result Qual - Units - MDL PC	Le . g Date 🖂 A	analyst
Digestion - Microwave	M3051, HNO3	•	10/27/98	sw

Note: Duplicate precision for Chromium and Vanadium exceeds ACZ's QC limit of 20% RPD. The Silver analysis was performed using method of standard additions. The Silver value is estimated due to matrix interferences.

Inorganic Qualifices (based on EPA CLP 3/90)

U = Analyte was analyzed for but not detected at the indicated MDL

B = Analyte concentration detected at a value between MDL and PQL

PQL = Practical Quantitation Limit



ACZ Laboratories, Inc. 30400 Downhill Drive Steamboat Springs, CO 80487

(800) 334-5493

URS Operating Services, Inc. 1099 18th Street Suite 710 Denver, CO 80202-1908 Karen Kuoppula Lab Sample ID: L20861-02
Client Sample ID: VB-SP-1S
Client Project ID: Vasquez Blvd
ACZ Report ID: RG80220

Date Sampled: 10/23/98 15:15
Date Received: 10/24/98
Date Reported: 10/29/98

Sample Matrix: Soil

Metals Analysis

Metals Allalysis								
Parameter	TEST EPANethod	Results	F, Qual	- Units	MDL	PQL	Date A	nnlyst
Aluminum, total (3051)	M6010B ICP	26800		mg/Kg	4	20	10/28/98	gg
Antimony, total (3051)	M7041 GFAA		U	mg/Kg	0.2	1	10/28/98	bg
Arsenic, total (3051)	M7060 GFAA	6.2		mg/Kg	0.5	2	10/27/98	jb
Barium, total (3051)	M6010B ICP	197		mg/Kg	0.4	i	10/28/98	gg
Beryllium, total (3051)	M6010B ICP	0.8	В	mg/Kg	0.2	1	10/28/98	gg
Cadmium, total (3051)	M7131 GFAA	. 0.4	В	mg/Kg	0.1	0.6	10/28/98	bg
Calcium, total (3051)	M6010B ICP	22600		mg/Kg	20	100	10/28/98	gg
Chromium, total (3051)	M6010B ICP	16		mg/Kg	1	6	10/28/98	. gg
Cobalt, total (3051)	M6010B ICP	.7		mg/Kg	1	6	10/28/98	gg
Copper, total (3051)	M6010B ICP	27		mg/Kg	1	6	10/28/98	gg
Iron, total (3051)	M6010B ICP	16500		mg/Kg	1	6	10/28/98	gg
Lead, total (3051)	M7421 GFAA	22.3		mg/Kg	0.5	2	10/28/98	bg
Magnesium, total (3051)	M6010B ICP ·	4370		mg/Kg	20	100	10/28/98	gg
Manganese, total (3051)	M6010B ICP	357		mg/Kg	0.6	1	10/28/98	gg
Mercury, total	M7471 CVAA	0.04	В	mg/Kg	0.02	0.1	10/28/98	bg
Nickel, total (3051)	M6010B ICP	18		mg/Kg	1	6	10/28/98	gg
Potassium, total (3051)	M6010B ICP	3110		mg/Kg	40	100	10/28/98	gg
Selenium, total (3051)	M7742 Modified, AA-Hydride	0.4	В	mg/Kg	0.1	0.6	10/28/98	bg
Silver, total (3051)	M7761 GFAA	0.42		mg/Kg	0.06	0.3	10/28/98	jb
Sodium, total (3051)	M6010B ICP	200		mg/Kg	40	100	10/28/98	gg
Thallium, total (3051)	M7841 GFAA	0.3	В	mg/Kg	0.2	1	10/28/98	bg
Vanadium, total (3051)	M6010B ICP	28.1		mg/Kg	0.6	3	10/28/98	gg
Zinc, total (3051)	M6010B ICP	87		mg/Kg	1	6	10/28/98	gg

Soil Analysis

Parameter	EPA Method	Result 🔁 Q	ual : 4 Units - 4	MDL PQL	- Date - A	nalyst
Solids, Percent	CLPSOW390, PART F, D-98	82.3	%	0.1 0.5	10/27/98	cc

Soil Preparation

Parameter	EPA Method	Result Qual Winits MDL	PQL Date An	alyst
Digestion - Microwave	M3051, HNO3	·	10/27/98	sw

Note: Duplicate precision for Chromium and Vanadium exceeds ACZ's QC limit of 20% RPD. The Cadmium and Silver analyses were performed using method of standard additions. The Silver value is estimated due to matrix interferences.

Inorganic Qualifiers (based on EPA CLP 3/90)

U = Analyte was analyzed for but not detected at the indicated MDL

B = Analyte concentration detected at a value between MDL and PQL

PQL = Practical Quantitation Limit

Vice President of Operations: Ralph Poulsen

1

PARTICULATE FILTER CASSETTE ANALYTICAL RESULTS



300 UNION BOULEVARD, SUITE 600, LAKEWOOD, CO 80228

PHONE: (303) 763-7188 FAX: (303) 763-4896

TECHLAW INC.

December 21, 1998

Ms. Lori Raschke URS Operating Services, Inc. 1099 18th Street, Suite 710 Denver, CO 80202

RE: Transmittal of Data Validation Reports

Vasquez and I-70 TDD No. 75-80914

Report Nos. 98-10-306, 98-10-234, 983003, and 302114

Dear Ms. Raschke:

Please find the enclosed data validation reports for TDD No. 75-80914 for the Vasquez and I-70 project. These reports are for the validation of metals (arsenic, cadmium, and lead) analyses by SW-846 methods.

If you have any questions regarding the enclosed reports, please contact me at (303) 763-7188.

Yours sincerely,

TECHLAW, INC.

Lisa Burnley

Associate Consultant

enclosure IF: 0252-167

REGION VIII SUMMARY OF DATA QUALITY ASSURANCE REVIEW INORGANIC

TDD No.	Site 1	Vame	Operable Unit
75-80914	Vasquez & I-70		
RPM/OSC Name			
Pete Stevenson			
Contractor Laboratory	Contract No.	Report No.	Laboratory DPO/Region
Paragon Analytics, Inc.	OS-98-P-5459	98-10-306	

Review Assigned Date	December 2, 1998	Data Validator	Bill Fear
•	December 21, 1998	Report Reviewer_	Amy Ballow

Sample ID	Laboratory ID	Matrix	Analysis
4940STN-10-22	9810306-1	Filter	Metals (Arsenic, Cadmium, and Lead) by SW-846 Method 6010
4940STS-10-22	9810306-2		
4940STE-10-22	9810306-3		
4771VI-WEST	9810306-4		
4771VI-SOUTH	9810306-5		
4771VI-EAST	9810306-6]	·
4771VI-EAST D	9810306-7		

DATA QUALITY STATEMENT

()	Data are ACCEPTABLE according to by the reviewer.	EPA Functional guidelines with no qualif	ñers (flags) added
() (X)	Data are UNACCEPTABLE according Data are acceptable with QUALIFICA		
Telepl	none/Communication Logs Enclosed?	Yes NoX	_
TDO /	Attention Required? Vec	No. V. If you list the items the	t magnina attantian.

INORGANIC DATA QUALITY ASSURANCE REVIEW

REVIEW NARRATIVE SUMMARY

This data package was reviewed according to "USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review," February 1994, modified for the method used. Qualification taken on sample results based on the Functional Guidelines that differ from method requirement are identified within the report.

The data package TDD No.75-80914, Report No. 9810306, consisted of seven filter samples for arsenic, cadmium, and lead analyses by SW-846 Method 6010.

The following table lists the data qualifiers added to the sample analyses. Please see Data Qualifier Definitions, attached to the end of this report.

Sample ID	Elements	Qualiflers	Reason for Qualification	Review Section
98-10-306-1, 98-10-306-3, 98-10-306-6	Lead	UJ	Negative blank contamination	VII
98-10-306-2, 98-10-306-4, 98-10-306-5, 98-10-306-7		J		

9810306m Inorganic - 3

	d/SOW Number SW-846, Method 6010							
Revisi	on0.0							
	Inorganic Deliverables Completeness Checklist							
NA P P NA P NA P NA P NA P	Continuing Calibration Verification Results CRDL Standard for ICP and AA Blank Analysis Results ICP Interference Check Sample Results Spiked Sample Results Post-digest spiked Sample Analysis							
NA P P P	Raw Data P Samples P Calibration Standards P Duplicates P ICP QC (ICS and Serial Dilution NA Furnace AA NA Mercury Analysis Percent Solids Calculations - Solids Only Sample Prep/Digestion Logs Analysis Run Log Chain-of-Custody Sample Description Case Narrative Method References	<u>P</u>	Blanks LCS Cyanide Analy	P Spikes				
KEY: P R NP NR NR	 Provided in original data package, as required by the SOW Provided as Resubmission Not provided in original data package or as resubmission Not required under the SOW Not applicable to this data package or analysis 							

I.	DEL	IVER	ARI	FS
1.	ULL	11 A 17-17	ΛDI	دىنايا

Comments:

None.

1.	DELIVERAE	BLES
	All deliverable	es were present.
	Yes_X_	No
	Comments:	None.
II.	HOLDING T	IMES AND PRESERVATION CRITERIA
	All holding tin	nes and preservations criteria were met.
	Yes	No_X_
	Comments:	The samples were analyzed within holding times; however, the temperature at the time of sample receipt was not recorded. No action was taken.
III.	INSTRUMEN	IT CALIBRATIONS: STANDARDS AND BLANKS
	Initial instrume	ent calibrations were performed according to requirements.
	Yes_X_	No
	Comments:	None.
	The instrumen	ts were calibrated daily and each time an analysis run was performed.
	Yes_X_	No
	Comments:	None.
	The instrumen	ts were calibrated using one blank and the appropriate number of standards.
	Yes <u>X</u>	No

IV. FORM 1 - SAMPLE ANALYSIS RESULTS

	Sample analys	es were entered correctly on Form Is.						
	Yes_X_	No						
	Comments:	None.						
v.	FORM 2A - I	NITIAL AND CONTINUING CALIBRATION VERIFICATION						
	The initial and requirements.	d continuing calibration verification standards (ICV and CCV, respectively) met						
	Yes_X_	No						
	Comments:	None.						
		n verification results were within 90-110% recovery for metals, 85-115% for 0-120% for mercury.						
	Yes_X_	No						
٠	Comments:	None.						
	The continuing	calibration standards were run at 10% frequency.						
	Yes_X_	No						
	Comments:	None.						
VI.	FORM 2B - C	RDL STANDARD FOR ICP AND AA						
	ICP Analysis: Standards (CRI) at two times the CRDL or the IDL (whichever were greater) were analyzed at the beginning and the end of each sample run, or at a minimum of twice per eight hours, whichever was more frequent.							
	Yes_X_	No						
	Comments:	A CRDL standard was not required for method 6010.						

	sample run.	sis: Standards (CRA) at two times CRDL were analyzed at the beginning of each
	Yes	No NA_X_
	Comments:	None.
	The CRI and/	or the CRA were analyzed after the ICV.
	Yes	No NA_X_
	Comments:	None.
VII.	FORM 3 - BI	LANKS
	The initial and	continuing calibration blanks (ICB and CCB, respectively) met requirements.
	Yes_X_	No
	Comments:	None.
	The continuing	g calibration blanks were run at 10% frequency.
	Yes_X_	No
	Comments:	Continuing calibration blanks were run every 10 samples.
		reparation blank was run at the frequency of one per twenty samples, or per sample (whichever is more frequent), and for each matrix analyzed.
	Yes_X_	No
	Comments:	None.
	All analyzed b	lanks were free of contamination.
	Yes	No_X
	Comments:	The following table lists the blanks with contamination, elements present, affected samples, and data qualifiers.

Blank Contaminants

Blan k ID	Date	Contaminant	Concentration Found in Blank (ug/filter)	IDL (ug/L)	Associated Samples	Concentration Found in Sample (ug/filter)	Qualifier/ Adjustment
РВ	11/03/98	Lead	-0.186	1.0	98-10-306-1 98-10-306-3 98-10-306-6	0.1 U	υJ
					98-10-306-2 98-10-306-4 98-10-306-5 98-10-306-7	0.19 0.13 0.12 0.11	J

For negative blank contamination, detected sample results less than 5 times the absolute value of the blank were qualifed as estimated (J) and non-detected results were qualified as estimated (UJ).

VIII. FORM 4 - ICP INTERFERENCE CHECK SAMPLE

The ICP interference check sample (ICS) was run twice per eight hour shift and/or at the beginning	ng
and end of each sample set analysis sequence (whichever is more frequent).	

Yes_X_ No_{-}

Comments: None.

Percent recovery of the analytes in solution ICSAB were within the range of 80-120%.

No____ Yes_X_

Comments: Arsenic, cadmium, and lead recoveries from the ICSAB solution were within QC

criteria. ICSA data were not required for method 6010.

FORM 5A - MATRIX SPIKE SAMPLE ANALYSIS IX.

A matrix spike sample was analyzed with every twenty or fewer samples of a similar matrix, or one per sample delivery group (whichever is more frequent).

Yes X No____

Comments: Because these samples are filters and only one filter for each sample was provided

the laboratory could not perform a pre-digestion spike. Therefore, the post

digestion spikes are evaluated as a pre-digestion spike.

The percent recoveries (%R) were calculated correctly.

% Recovery =
$$\frac{(SSR - SR)}{SA}$$
 X 100

SSR = spiked sample result SR = sample result

SA = spike added

Yes_X No___

Comments: None.

Spike recoveries were within the range of 75-125% (an exception is granted where the sample concentration is four times the spike concentration).

Yes_X_ No___

Comments: None.

X. FORM 5B - POST DIGEST SPIKE RECOVERY

A post-digest spike was performed for those elements that did not meet the specified criteria (i.e., Pre-digestion/pre-distillation spike recovery falls outside of control limits and sample result is less than four times the spike amount added, exception: Ag, Hg).

Yes___ No___ NA_X_

Comments: Post digestion spikes were evaluated as the matrix spikes.

XI. FORM 6 - DUPLICATE SAMPLE ANALYSIS

Duplicate sample analysis was performed with every twenty or fewer samples of a similar matrix, or one per sample delivery group (whichever is more frequent).

Yes___ No_X

Comments: Duplicate data were performed using a laboratory control sample duplicate due to

insufficient sample size. (One filter per sample.)

The RPDs were calculated correctly.

$$RPD = \frac{(S-D)}{(S+D)/2} \times 100$$

S = sample D = duplicate

Yes_X_ No___

Comments: None.

For sample concentrations greater than five times the CRDL, RPDs were within $\pm 20\%$ (limits of $\pm 35\%$ apply for soil/sediments/tailings samples).

Yes_X_ No___

Comments: None.

For sample concentrations less than five times the CRDL, duplicate analysis results were within the control window of \pm CRDL (two times CRDL for soils).

Yes X No___

Comments: None.

XII. GFAA QC

Duplicate injections were performed on all GFAA samples and the RSD was within $\pm~20\%$.

Yes___ No__ NA_X

Comments: None.

Analytical spikes were performed on all GFAA samples and the percent recovery was 85 - 115%.

Yes___ No___ NA_X_

Comments: None.

MSAs were analyzed when required and the correlation coefficient was > 0.995.

Yes___ No__ NA_X_

Comments: None.

XIII. FORM 7 - LABORATORY CONTROL SAMPLE

	y control sample (LCS) was prepared and analyzed with every twenty or fewer imilar matrix, or one per sample delivery group (whichever is more frequent).
Yes_X_	No
Comments:	None.
All results wer	re within control limits.
Yes_X_	No
Comments:	None.
FORM 8 - ST	ANDARD ADDITION RESULTS
Results from g	raphite furnace standard additions were entered on Form VIII.
Yes	No NA_X_
Comments:	None.
FORM 9 - IC	P QC
	n was performed for ICP analysis with every twenty or fewer samples of a similar per sample delivery group, whichever is more frequent.
Yes_X_	No
Comments:	None.
The serial dilu	tion was without interference problems.
Yes_X_	No
Comments:	None.
	Samples of a s Yes_X_ Comments: All results were Yes_X_ Comments: FORM 8 - ST Results from g Yes Comments: FORM 9 - IC: A serial dilution matrix, or one Yes_X_ Comments: The serial dilution matrix.

XVI. FORM 10 - QUARTERLY INSTRUMENT DETECTION LIMITS (IDL)

	IDLs were pr	ovided for all elements on the target analyte list.
	Yes_X_	No
	Comments:	None.
	Reported IDI	s met requirements.
	Yes_X_	No
	Comments:	None.
XVII.	FORM 11 - I	NTERELEMENT CORRECTION FACTORS FOR ICP
	Interelement of	corrections for ICP were reported.
	Yes_X_	No
	Comments:	The interelement corrections provided were obtained more than a year prior to sample analysis. No action was required.
XVIII.	FORM 12 - I	CP LINEAR RANGES
	ICP linear ran	ages were reported.
	Yes_X_	No
	Comments:	None.
XIX.	LINEAR RA	NGE VERIFICATION ANALYSIS
	Linear Range of ± 5% of the	Verification Analysis (LRA) was performed and results were within control limits ne true value.
	Yes	No NA_X
	Comments:	None.

XX. FORM 13 - PREPARATION LOG

Information on the preparation of samples for analysis was reported on Form XIII.

Yes_X_

No____

Comments:

None.

XXI. FORM 14 - ANALYSIS RUN LOG

A Form XIV with the required information was filled out for each analysis run in the data package.

Yes_X_

No___

Comments:

None.

XXII. Additional Comments or Problems/Resolutions Not Addressed Above

Yes_X_

No____

Comments:

Only the results for arsenic, camium, and lead were reported on the Form 1s for

the metal analyses.

INORGANIC DATA QUALITY ASSURANCE REVIEW

Region VIII

DATA QUALIFIER DEFINITIONS

For the purpose of Data Validation, the following code letters and associated definitions are provided for use by the data validator to summarize the data quality. Use of additional qualifiers should be carefully considered. Definitions for all qualifiers used should be provided with each report.

GENERAL QUALIFIERS for use with both INORGANIC and ORGANIC DATA

- R Reported value is "rejected." Resampling or reanalysis may be necessary to verify the presence or absence of the compound.
- The associated numerical value is an estimated quantity because the Quality Control criteria were not met.
- U J The reported amount is estimated because Quality Control criteria were not met. Element or compound was not detected.
- N J The analysis indicates the presence of an analyte that has been "tentatively identified" and the associated numerical value represents its approximate concentration.
- The analysis indicates the presence of an analyte for which there is presumptive evidence to make a tentative identification.
- U The material was analyzed for, but was not detected above the level of the associated value.

 The associated value is either the sample quantitation limit or the sample detection limit.

9810306m Inorganic - 14

ACRONYMS

AA Atomic Absorption

Ag Silver

CCB Continuing Calibration Blank

CCV Continuing Calibration Verification

CFR Code of Federal Regulations
CLP Contract Laboratory Program
CRA CRDL standard required for AA
CRDL Contract Required Detection Limit
CRI CRDL standard required for ICP

CV Cold Vapor

EPA U.S. Environmental Protection Agency
GFAA Graphite Furnace Atomic Absorption

Hg Mercury

ICB Initial Calibration Blank
ICP Inductively Coupled Plasma
ICS Interference Check Sample

ICSA Interference Check Sample (Solution A)
ICSAB Interference Check Sample (Solution AB)

ICV Initial Calibration Verification
IDL Instrument Detection Limit
LCS Laboratory Control Sample

LRA Linear Range Verification Analysis

MSA Method of Standard Additions

PDS Post Digestion Spike

QC Quality Control

RPD Relative Percent Difference RPM Regional Project Manager

RSD Percent Relative Standard Deviation

SA Spike Added

SAS Special Analytical Services
SDG Sample Delivery Group

SOW Statement of Work

SR Sample Result

SSR Spiked Sample Result
TPO Technical Project Officer

9810306m Inorganic - 15

מסים	SAMPLE	NT/
DEA	SHILL	MO.

							4940STN
	_	_	Contract: _			_ _	
Lab Code: NA	Ca	se No.:	SAS No.	: _		S	SDG No.: VASQUE
Matrix (soil/w	water): FILT	ER		La	b Sam	ple	ID: 9810306-1
Level (low/med	i): LOW_	_		Da	te Re	ceiv	red: 10/30/98
% Solids:	100.	0					
Co	oncentration	Units (ug	/L or mg/kg dr	y w	eight): U	G/FILTER
		<u> </u>		П		<u> </u>	1
	CAS No.	Analyte	Concentration	C	Q	М	
	7440-38-2		0.30			- P - P	
		Cadmium Lead	0.02			- P-	レコ
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Color Before:	WHITE	Clari	ty Before: N/A		- "	-' <i>-</i> - Те	xture: FINE_
Color After:	COLORLESS	Clari	ty After: CLE	AR		Ar	tifacts:
Comments: FULL_CLIENT	_SAMPLE_ID_	IS_4940STN	-10-22			·	· · · · · · · · · · · · · · · · · · ·
					-		
							

EPA	SAMPLE	NO.
-----	--------	-----

ab Name: PARA	GON ANALYTI	cs	Contract: _			4	940STS	
	_		SAS No.			SD	G No.:	VASOUE
atrix (soil/w		-			b Sampl			
					te Rece			
evel (low/med		_		Da	te kete	TAC	u: 10/.	50/98
Solids:	100.	0 .						
Co	ncentration	Units (ug	/L or mg/kg dry	y w	eight):	UG	/FILTE	2
	CAS No.	Analyte	Concentration	С	Q	м		
	7440-38-2	Arsenic	0.30	<u></u>		P_		
	7440-43-9 7439-92-1	Cadmium	0.02			P_	7	
						_	7	
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olor After:	COLORLESS	Clari	ty After: CLE	AR_		Art	ifacts	· !
omments:			-10-22					:

·		INORGANIC	1 ANALYSES DATA :	SHE	ET	EP.	A SAMPLE	NO.
Lab Name: PAR	LCON ANALVTI		Contract			4	940STE	
	_					- 1		
Lab Code: NA	Ca	se No.:	SAS No.	: _		SD	G No.: VA	SQUE
Matrix (soil/w	water): FILT	ER		Lab	o Samp	ole I	D: 981030	6-3
Level (low/med	d): LOW_			Dat	ce Rec	eive	d: 10/30/	98
% Solids:	100.	0						
Co	oncentration	Units (ug	/L or mg/kg dry	y we	eight)	: UG,	/FILTE <u>R</u>	
	CAS No.	Analyte	Concentration	С	Q	М		
	7440-38-2		0.30			P P		
	7440-43-9	Cadmium_ Lead	0.02			P_ P_	J.	
		Dead				:	、 、 、 、 、 、 、 、 、 、 、 、 、 、 、 、 、 、 、	
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Color Before:	WHITE	Clari	ty Before: N/A					INE_
Color After:	COLORLESS	Clari	ty After: CLE	AR_	٠	Art	ifacts: _	
Comments: FULL_CLIENT	SAMPLE_ID_	IS_4940STE	-10-22			,,	1	<u> </u>

FORM I - IN

TITA CAMPITY S	\sim
EPA SAMPLE N	()

Lab Name: PARA	AGON_ANALYTI	CS	Contract:		4771VI-WEST
	_			:	SDG No.: VASQUE
Matrix (soil/w	ater): FILT	ER		Lab Sampl	e ID: 9810306-4
Level (low/med	l): LOW_	· 		Date Rece	eived: 10/30/98
% Solids:	100.	0			
Co	ncentration	Units (ug	/L or mg/kg dry	y weight):	UG/FILTE <u>R</u>
	CAS No.	Analyte	Concentration	C Q	М
	7440-38-2 7440-43-9 7439-92-1	Arsenic_Cadmium_Lead	0.30 0.02 0.13	ט	P_ P
Color Before:	WHITE	Clari	ty Before: N/A		Texture: FINE_
Color After:	COLORLESS	Clari	ty After: CLE	AR_	Artifacts:
Comments:					

EDY	SAMPLE	NTO
DEA	SHULLIE	NO.

I ah Namo . DADA	ACON ANIAT VET	CC.	Contract.			4771VI-SOUTH
	_		Contract: _			SDC No - WASOUE
			SAS NO.			SDG No.: VASQUE
Matrix (soil/w	ater): FILT	ER		La	b Samp	ole ID: 9810306-5
Level (low/med	l): LOW_			Da	te Rec	eived: 10/30/98
% Solids:	100.	0				
Co	ncentration	Units (ug	/L or mg/kg dr	y w	eight)	: UG/FILTER
	CAS No.	Analyte	Concentration	С	Q	M
	7440-38-2	Arsenic_	0.30			P_
		Cadmium	0.02			P_ P
				-		
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				-		
				-		
						1 -
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						\$ 12/14/14
						_ \$
Color Before:	WHITE	Clari	ty Before: N/A			Texture: FINE_
Color After:	COLORLESS	Clari	ty After: CLE	AR_		Artifacts:
Comments:						
						
						

FDA	SAMPLE	NO
	ייום זוים כר	IAC) .

Lab Name: PARA	GON ANALYTI	CS	Contract:				4771VI-EAST		
	Case No.: SAS No.:					SDG No.: VASQUE			
Matrix (soil/w	_ -						ID: 9810306-6		
Level (low/med							red: 10/30/98		
% Solids:	100.						, ,		
			/L or mg/kg dry	y w	eight)	: บ	G/FILTE <u>R</u>		
	CAS No.	Analyte	Concentration	С	Q	М			
	7440-38-2 7440-43-9 7439-92-1	Arsenic_Cadmium_Lead_	0.30 0.02 0.10	[ט		P P P	U.Z		
							Oxizhin		
				- - - -					
Color Before:	WHITE		ty Before: N/A_				xture: FINE_		
Color After:	COLORLESS	Clari	ty After: CLE	AR_		Ar	tifacts:		
Comments:					· 				

EPA	SAMPLE	NO
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Tah Name Dana	CON ANATURE	CS	Contract			4771VI-I	EASTD
			Contract: SAS No.:			SDG No :	WASOUE
			SAS NO.				
Matrix (soil/w	ater): FILT	ER		Lal	b Sampl	le ID: 9810	0306-7
Level (low/med): LOW			Date Received: 10/30/98				
% Solids:	100.	0					
Co	ncentration	Units (ug	/L or mg/kg dry	y we	eight):	UG/FILTE	7
	CAS No.	Analyte	Concentration	c	Q	М	
	7440-38-2	Arsenic	0.30	₀ -		P	
	7440-43-9	Cadmium	0.02	U B		P_ P_ >	
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Color Before:	WHITE	Clarit	y Before: N/A_			Texture:	FINE_
Color After:	COLORLESS	Clarit	ty After: CLEA	AR_		Artifacts:	
Comments:							
							 -

I METAL ANALYSIS WORKSHEET -- HOLDING TIMES

ВАТСН:	69-10.	\mathcal{S}_{n}

Ust all analytes which do not meet holding time criteria

URS-

								T	
		PRE-		METALS	Hg CVAA	CN		NO. OF DAYS	
SAMPLE	Matix	SERVED	DATE	ANALYSIS	ANALYSIS	ANALYSIS	ANALYSIS	PAST HOLDING	
to			COLLECTED	DATE/S	DATE	DATE	DATE/S	TIME	_ ^
1	C:ler	1003	10-22-18	11-3-691		<u> </u>	<u> </u>	~0-	
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- 1. If holding times are exceeded, all sample results are estimated (J)/(UJ).
- 2. If holding times are grossly exceeded (>= 2*holding time), detected results are estimated (J), and non-detected results are rejected (R).

Validated By:

Reviewed By:

12-17-98

ANALYTE	HOLDING TIME	PRESERVATIVE	
	;	AQUEOUS	SOIL
Metals	180 days	pH < 2 w/HNCG, 4 Det C	4 Deg C
Mercury	28 days	IpH < 2 w/HNOS 4 Deg C	4 Det C
Cyanide	14 days	IpH > 12 w/NaOH, 4 Dec C	4 Dec C

IIA METAL ANALYSIS WORKSHEET -- ICP CALIBRATIONS

BATCH: 9870-304

List all ICP analytes that did not meet the percent recovery criteria for initial calibration verification (ICV) and continuing calibration verification (ICCV).

ANALYTE	00 00 00 00 00	TRUE	FOUND	% R	ACTION	SAMPLES AFFECTED
	411		90	-((0.	<i>(</i>	none)
	• •					
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				-		
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050						
Vas a CRD		mpie (CRI) a	nalyzed at th	e beginning	and at the er	nd of each sample run? Yes No (NA-6010

ICV/CCV Actions:

PERCENT RECOVERY

<75% 75-89% 90-110% 111-125% >125%

Detected results R J V J R

Non-detected Results R UJ V V V

^{1.} If the instrument was not calibrated daily and each time the instrument was set up, qualify the data as rejected (R).

IIB METAL ANALYSIS WORKSHEET -- AA CALBRATIONS

ATCH	

List all AA analytes that did not meet the percent recovery criteria for initial calibration verification (ICV) and continuing calibration verification (CCV).

ANALYTE	CCA ICA	TRUE	FOUND	% R	ACTION	SAMPLES AFPÉCTED
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		/		!	;	
	1	4			! 	
	1/]		1		
1. Were the	: ∞itext un	mber of stan	dards and b	anks used to	o calibrate th	instrument? Yes No
2. Is the init	tial galibrati	ions correlati	ion coefficien	t > 0.935?.	Yes No	
If no, list	arested an	alytes and se	amples.			
			A) analyzed a	at the beginn	ling of each s	emple run? Yes No
COMMENT						
					,	
Actions						

ICV/CCV Actions:

	PERCENT RECOVERY							
	<75%	75-89%	90-110°-	111-125%	>125%			
Detected results	R	J	. V	<i>3</i>	F.			
Non-detected Results	R	UJ	¥	•	`.			

If three standards and a blank were not used for initial call pratton, or the instrument was not calibrated daily and each time the instrument was set up, qualify the case as rejected (R).

^{2.} If the initial calibration correlation coefficient was less than 3.995, que no sample results as estimated (JingUJ).

IIC METAL ANALYSIS WORKSHEET -- Hg CALIBRATIONS

ct all more ic.	racilla that did	not meet the nom-	ant raceuses ad	teria for the KM	BATCH: and/or CCV standards.
ICV					
CCV	TRUE	FOUND	<u>%R</u>	ACTION	SAMPLES AFFECTED
	 				
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1. Were the o	orrect number o	of standards and b	lanks used to c	alibrate the instr	umem? Yes No
2. Is the initia	l calibration cor	relation coefficient	> 0.995?	Yes No	
	effected sample				
		le (CRA) analyzed	at the beginnin	g of each sampl	le run? Yes No
COMMENTS					
		·			
				,	
			 -		
Actions		· · · · · · · · · · · · · · · · · · ·			
				PERCENT R	
Datastast	~ .14~	<65%	65-79%	80-120%	12" - 135% >:35%
Detected res		R R	IJ	V V	F L v v
		• •		▼	•

^{1.} If four standards and a blank were not used for initial calibration, or the instrument was not calibrated daily and each time the instrument was set up, qualify the data as rejected (R).

^{2.} If the initial calibration correlation coefficient was less than 0.995, qualify sample results as estimated (J)/(UJ).

IID METAL ANALYSIS WORKSHEET -- CN CAUBRATIONS

CV CV	TRUE	FOUND	%R	ACTION	SAMPLES AFFECTED
	 	1			
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			7		
ere the	correct rumb	er of standards	and blanks u	sed to calibrate	the instrument? Yes No
		∞rrelaxion coe			No
	affected samp	 _		· · · · · · · · · · · · · · · · · · ·	
			l and an ICV	distilled? Yes	No.
	t affected samp		and an love	<u> </u>	. 110
		pies.			
MMENT	-				<u></u>
					

	PERGENT RECOVEN:						
	<70%	70-84%	85-115%	116-130%	>130%		
Detected results	R	J	٧	J	R		
Non-detected results	R	U:	٧	V	V		

^{1.} If three standards and a blank were not used for Initial calibration or the Instrument was not calibrated daily and each itime the instrument was set up, qualify the data as rejected (R).

^{2.} If the initial calibration correlation coefficient was less than 0.955, calify samples results as estimated (J)/(W).

^{3.} If a mid-range standard (or ICV) was not distilled, qualify sample results as estimated (J)/(UJ).

III METAL ANALYSIS WORKSHEET -- BLANKS

4 4ha blah	MATRIX	10110		_	BATCH;	₹8-10-316 ·
t the highes	L POSITIVE AND	negative by	ank result > =	IDLI below.	Use one wo	orksheet for soll matrix and another for water ma
ANALYTE	CCB PB/MB	IDL	1 DOWN	5 * Bl. Conc.		i e
PB	BB	1.0		- 0.93	43	SAMPLES AFFECTED
	_F.\	7.0			·	1,3,4
		 	NG/Filks			2,4,5,7/
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OTE: Veit	45-141	<u> </u>	!	<u> </u>		
OIE. Verry	thet the abso	olula value c	any analyte	concentration i	n the PB or I	M3 is < CRDL
OMMENTS						
						·

Actions:

- 1. If [Blank] < IDL, no action is taken.
- 2. If Blank > = IDL, then all sample res. is > = IDL and < 5*Blank are non-detected (U).
- If Blank = < -IDL and raw data sample result is = < IDL then ron-detected results are estimated (UJ).
 If Blank = < -IDL and raw data sample result is = < IDL then ron-detected results are estimated (UJ).

Detected results

Non-detected results

IVA METAL ANALYSIS WORKSHEET -- ICP INTERFERENCE CHECK SAMPLE

٨.	rc	٩ŧ	1.	

NOTE: The sample results can be accepted without qualification. If the sample concentrations of Al, Ca, Fe, and Mg are less than or equal to the concentration found. In the ICSA solution.

Examine the sample results in ug/I and list any Al, Ca, Fe, or Mg results that are greater than the ICSA values.

SAMPLE ICS COMMENTS

ID ANALYTE RESULT VALUE COMMENTS

ANALYTE	% R	ACTION .	SAMPLES AFFECTED
-		Ţ	
· · · · · · · · · · · · · · · · · · ·	4/80	120%	
		<u> </u>	
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ere Interferenc	e Check Sample	s run at the beginn	ning and end of each sample analysis run, or a minimum
of twice per	8-hour shift (whi	chever is more fre	quent)? Yes No
OMMENTS			
ctions:			PERCENT RECOVERY

J

UJ

J

V

R

, R

IVB METAL ANALYSIS WORKSHEET -- ICP INTERFERENCE CHECK SAMPLE

BATCH: 9270-304

	ICSA		stected in the ICS.	SAMPLE/	SAMPLE/	SAMPLE/	04117
ANALYTE	RESULT	ACTION	RESULT	RESULT	RESULT	RESULT	SAMPLE
MINLITE	NESOLI_	ACTION	NESOL1	nesoci	NESOLI	RESULI	RESULT
							
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Actions:

If the ICSA value > the positive IDL:

- 1. For non-detected results, no action is taken.
- 2. Estimate (J) all detected results $<= 5^{\circ}1CSA$.

If the ICSA value < -IDL:

- 1. Estimate (J) detected results $<= 5^{\circ}|ICSA|$.
- 2. Estimate (W) non detected results.

	'		NALYSIS W	ORKSHEET	PRE	-DIGESTION	N MATRIX SPIKE
1	MATRIX:	Fiter.				BATCH:	[b-10-306
ist ali naram	eters that do	not meet the	percent reco	wery criteria.	Note: The	pre-digestion	n spike recovery criteria
are not ev	aluated for C	a. Mg. K. Na.	AL and Fe fo	r soil sample	s, and Ca, I	Mg, K, and Na	for water samples.
the sample	result exceed	ds the spike a	dded by a fa	ctor of 4 or n	nore, no act	ion is taken.	
SAMPLE		SAMPLE	SAMPLE	SPIKE]	*
D_	ANALYTE	RESULT	RESULT	ADDED	<u>% R</u>	ACTION	SAMPLES AFFECTED
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					frequency c	cace every :	20 samples, or every SDG
	ver is more f		Yes			post due	
	ry criteria?	matrix spik Yes	e analyzeo 10 No	UA CP EIE:		رد ک ری احک ری	did not meet the pre-digestion matrix
COMMEN							
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L							
1. If any a Actions:	nalyte does r	ot meet the S	R criteria, q	ualify all asso	oiated sam	cles using the	following criteria:
			Percent R			•	
Dalastari	an alto	<30%	30-74%	75-125%			
Detected r	esults ected results	J R	IJ	V V) J		

VI METAL ANALYSIS WORKSHEET -- LABORATORY DUPLICATES

	MATRIX:	A-14		_			BATCH: 97-10-309
ist all paran	neters that do	not meet % diff	erence or CRI	OL criteria.		,	
SAMPLE	ANALYTE	VALUE	VALUE	RPD	DIFFERENCE	АСПОИ	SAMPLES AFFECTED
	- ANALITE	VALUE	VALUE		DILLEROL	7011011	CALVII LES ATECTED
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			due h				
Actions:						·	

1. AQUEOUS

If sample value > 5*CRDL, estimate (J) all sample results of the same matrix # the RPD is > 20%.

If sample value < 5*CRDL, and the difference between the duplicate and the original is > CRDL, estimate (J)/(UJ) all sample results of the same matrix.

2. SOLID

If sample value > 5*CRDL, estimate (J) all sample results of the same matrix fithe RPD is > 35%.

If sample value < 5*CRDL, and the difference between the duplicate and the original is > 2*CRDL, estimate (J)/(W) all sample results of the same matrix.

*Difference = [Sample result - Duplicate sample result]

VII METAL ANALYSIS WORKSHEET -- LABORATORY CONTROL SAMPLES

	MATRIX:	Filter		_		BATCH: 27-10-306
List all parame	ters that do no	ot meet the pe	rcent recovery	criteria.		
LCS ID	ANALYTE	TRUE VALUE	FOUND	%R	ACTION	SAMPLES AFFECTED
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COMMENTS	S				. 	
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ł						
Actions:						
Exception: a	entimony and s	iver have no d	∞ntrol limits. /	An aqueous LO	S is not requir	ed for CN and mercury.
				FEROENT RE	ECOVERY	
1. AQUEOU			<50%	50-79%	80-120%	
Detected Non-dete	resuns Ected results		R R	UJ UJ	Ÿ	J V
			• •	,	•	•
2. SOLID LO	US		25 211		:	
			BELOW	34.75	V V	ASOVE
Detected	:esults	•	CONTROLL	∵ 3	CONTROLL	
	ested results		Ü		$\dot{\cdot}$	A A

VIIIA METAL ANALYSIS WORKSHEET -- ANALYTICAL SPIKE ANALYSIS

BATCH: List all samples whose analytical spike recovery did not meet the 85-115 % recovery criteria. SPIKED TRUE SAMPLE SAMPLE SAMPLE SPIKE ACTION RESULT RESULT VALUE %R ANALYTE COMMENT ID

1. Spike Recovery: One point analytical spikes were performed for all GFAA samples? Κ'n COMMENTS

If the sample result is <50% of the spike result, or the sample result is >50% of the spike result. and the percent recovery is <40% or between 85 - 115%, the following apply:

		PERCENT A	RECOVERY	
Actions:	<:0%	10-84%	85-115%	>115
Detected results	J	J	V	j
Non-detected results	R	ÜJ	٧	V
*Spike result = [spiked san	nple result — sa	emple result[•

BATCH:

VIIIB METAL ANALYSIS WORKSHEET -- FURNACE AA ANALYSIS

	result is >= 50%		esult and the pe	ercent recover	y was between	40-84%	
Or >115%, fi	en MSA must be les for which an M	репоппес. ISA analysis w	as required by	t not performed	d, or MSA resul	ts were outsid	le control limits
	SAMPLE	1st CORR	2nd. CORR				
ANALYTE	ID_	COEFF.	COEFF.	ACTION		COMMENT	
					·		
						<u> </u>	
		_ ,					
						/-	
							M
						A = A A	/ ('
		ļ					
Actions							
1. Estimate	(J) if an MSA was	required and	not performed.	· /.		.	
2. If the cor	relation coefficient	t was < 0.995,	the MSA shoul	d be performe	d a second time	e. Estimate (J) all sample results.
	•	omea, or me r	eanalysis corre	elation coefficie	was < 0.995	o' or reang floc	m the highest correlation coefficien
wasnotr	ериеа.		/				
List all same	oles > CRDL who	se duplicate in	jections dig no	t agree within:	20% RSD c: Cv	/, or ಜನ್ನಾles i	n which duplicate
	were not performe		/			, 	
	SAMPLE	SAMPLE	DUPLICATE	%RSD			
ANALYTE	ID ID	RESULT	PESULT	or CV	CRDL	MCITOA	COMMENT
			V	!	1	<u> </u>	
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	SAMPLE		DUPLICATE	%RSD			
ANALYTE	ID	RESULT	RESULT	or CV	CRDL	MCITOA_	COMMENT
		. /	Y				
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	<i>Y</i>				1		
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*Spike result = |spiked sample result - sample result|

Actions

- 1. Estimate (J) detected results greater than the CRDU if duplicate injections are outside 20% RSD.
 2. Estimate (J) all sample results if duplicate injections were not performed.

IX METAL ANALYSIS WORKSHEET -- ICP SERIAL DILUTION ANALYSIS

Serial dilution	MATRIX:	£-17	odajaal eama	mer FARIOL	and & D > 400	BATCH: <u> </u>	
ANALYTE	IDL	50*DL	SAMPLE RESULT	SERIAL DILUTION RESULT	% D	ACTION	SAMPLES AFFECTED
						 	
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INDLICTAGE	COURTED	DI ACUA CO	0141 0111 = 5		<u>.</u>	1 .	
) serial dilution	is were perfo	med for each	RML DILUTION	NANALYSIS:	hilad camel	e en el colo e c	eed within tan percent of the
					الراءع وحرابا	e e leysis agi	eso within ten percent of the
Serial dilution	s were not b	erformed for	the following:				
COMMENTS		1.1					
		+ ~ +	>/-				
/							
					_		
<u> </u>		·		·	<u> </u>		· · · · · · · · · · · · · · · · · · ·

Actions

Estimate (J) detected results if %D is > 10%.

X METAL ANALYSIS WORKSHEET -- SAMPLE RESULT VERIFICATION

...

BATCH:		

topo de coloulorio
1. Describe any raw data anomalies (i.e. baseline shifts, negative absorbances, transcription or calculation errors, legibility, etc.)
M we
, , , , ,
2. List results that fall outside the linear range of the ICP instrument or the calibrated range of the AA or Cyanide instrument,
and were not reanalyzed.
- $ -$
3 Were ICP linear ranges obtained within 3 months of, and preceding, the sample analyses? - Yes No NA
3. Were ICP linear ranges obtained within 3 months of, and preceding, the sample analyses? - Kes No NA
4. Were ICP interelement corrections obtained within 12 months of, and preceding, the sample analyses? Yes No NA
just over 12 months
5. Were Instrument detection limits present, found to be less than or equal to the CRDL, and obtained within 3 monts of, and preceed
the sample analyses? (Yes) No NA
6. Were all sample results reported down to the IDL? /res) No
7. Were sample weights, volumes, percent solids, and dilutions used correctly when reporting the results? Yes No
7. Were sample weights, voluntes, policinismos, and choising controlled the sample weights, voluntes, policinismos, and choising controlled the sample weights.
COMMENTS
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(Felter
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10 Instrument Detection Limits (Quarterly)

Lab Name:	PARAGON_AN	ALYTICS		Contract	:	
Lab Code:	NA	Case No.:		SAS No.:		SDG No.: VASQUE
ICP ID Num	ber:	TJA_611	E_4	Date:	10/15/98	·
Flame AA I	D Number :					
Furnace AA	ID Number	:				
	Analyte Arsenic_Cadmium_Lead	Wave- length (nm) 189.04226.50220.35	ground	CRDL (ug/L)10	IDL (ug/L) 3.0 0.2 1.0	P
ļ				ll	l <u></u> l.	I
Comments:				,		

11A ICP INTERELEMENT CORRECTION FACTORS (ANNUALLY)

Lab Name: 1	PARAGON_AN	ALYTICS	Contr	act:		
ab Code: 1	NA	Case No.:	SAS N	o.:	SDG No	.: VASQUE
CP ID Numb	oer: TJA 61	LE 4	Date:	10/15/	97	
	Wave- length	I	nterelement	Correction P	Factors for	:
Analyte	(nm)	Al	Ca	Fe	Mg	BA_
ArsenicCadmium		_0.0000000	_0.0000000 _0.0000000 _0.0000130_	_0.0000000	_0.000000	_0.0000000
Lead		_0.0003640	-0.0000130_ 	_0.0000630		
	-					
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ommonta.						
omments:	·					<u></u>

11B ICP INTERELEMENT CORRECTION FACTORS (ANNUALLY)

	_	ALYTICSCase No.:	Contra	act:	SDG No	.: VASQUE
		·	Date:		97	
·						
	Wave- length	I	nterelement (Correction I	Factors for	:
Analyte	(nm)	co_	CR_	MN_	NI_	<u> </u>
ArsenicCadmiumLead		1-0.0000000	-0.0029800_ _0.0000000_ _0.0000000_	0.0000000	0.0000000	To.0000000
I	! !	1	l 	· ·	l 	l
Comments:						
		· · · · · · · · · · · · · · · · · · ·		 		

11B ICP INTERELEMENT CORRECTION FACTORS (ANNUALLY)

Lab Name:	PARAGON_ANA	LYTICS	Contr	act:		
Lab Code:	NA	Case No.:	SAS N	lo.:	SDG No	.: VASQUE
ICP ID Num	ber: TJA 61	E 4	Date:	10/15/9	7	
Analyte	Wave- length (nm)		nterelement	Correction F	actors for	:
Arsenic_Cadmium_Lead						
Comments:						

12 ICP LINEAR RANGES (QUARTERLY)

Lab Name: PARAG	ON_ANALYTIC	cs	Contract:			•
Lab Code: NA	_ Case 1	No.:	SAS No.:		SDG No.:	VASQUE
ICP ID Number:	TJA 61E 4_	_	Date:	10/15/9	8	
	Analyte	Integ. Time (sec.)	Concentration (ug/L)	М		
	Arsenic_ Cadmium_ Lead	15.00 15.00 15.00	10000.0 10000.0 10000.0	_ _P_		
						•
-						
·						
			44			
Comments:						
				·		

13 PREPARATION LOG

Lab Name:	PARAGON_ANA	ALYTICS	Contract:	
Lab Code:	NA	Case No.:	SAS No.:	SDG No.:VASQUE
Method: P				

EPA Sample Preparation Weight Volume No. Date (gram) (mL) 4771VI-11/02/98 1.00 100 11/02/98 1.00 100 4771VI-11/02/98 100 4771VI-1.00 11/02/98 4771VI-1.00 100 11/02/98 4940STE 1.00 100 4940STN 11/02/98 1.00 100 11/02/98 4940STS 1.00 100 LCSS 11/02/98 1.00 100 LCSSD 11/02/98 1.00 100 **PBS** 11/02/98 1.00 100

14 ANALYSIS RUN LOG

Lab Name: PARAGON_ANALYTICS	Contract:
Lab Code: NA Case No.:	SAS No.: SDG No.:VASQUE
Instrument ID Number: TJA 61E 4	Method: P_
Start Date: 11/03/98	End Date: 11/03/98

777					Γ	-								Aı	na.	lyt	tes	3										
EPA Sample	D/F	Time	9	k R	Ā		P	Ţ	Γ															Γ		_	[
No.		S			s	D	В														1		}					
MIX	1.00	1042			$ \bar{x} $	ΙĪ	$\overline{\mathbf{x}}$				-	_		_	_	_		_	_	_				_		_		
MIX	1.00	1044			X	X	X	-	-	-	_	-	_		}_	-	_			1	I_		1.	-	}_] _	-	-
ICV	1.00	1048			X	X	X	-	_	_			<u> </u>											[I		
ICB	1.00	1054			X	X	X	-	_		_										<u> </u>			}_		-	_	-
ZZZZZZ	1.00	1057					ŀ	-	-	-	_	_	-	-	-	_	-	Ι.		_	-	_	_	ľ	-	-		-
ICSA	1.00	1100			\bar{x}	X	$\bar{\mathbf{x}}$	-	-	-	_	_	-	-	, –	_	-	_	_	_	-	-	-	-	-	-	-	-
ICSAB	1.00	1103			X	X	X	-	-	-	_	-	_		_	_	-	_	-	_	-	_	_	-	-	_		-
ccv	1.00	1106			X	Х	X	_	_	-	-	-	_	-	_	_	_	_	_	_	-	-	-	-	-	_	-	-
CCB	1.00	1112			X		X	-	-	-	_	_	_	-	_	_	-	_	_	_	-	-	-	-	-	_	_	-1
ZZZZZZ	1.00	1115		 -		1		-	_	_	_		_	-	_	_	_	_	_	_	_	-	-	-	-	_	-	-
ZZZZZZ	1.00	1118			-	-	-	-	-	-	_	_	_	_	-	_	_	_	_	-	-	-	-	-	-	_	-	-
ZZZZZZ	1.00	1124			-	-	-	-	-	-		-	_		-	-	-	_	-	_	-	-	-	-	-	_	-	-
ZZZZZZ	1.00	1127	_		-		_	-	_	-	-	_	_	-	_	_	-	_	-	_	-	-	-	-	-	-	-	-1
ZZZZZZ	5.00	1130			-	_	_	-	_	-		-	-	-	-	-	-	_	-	_	_	-	-	-	-	-	-	-
ZZZZZZ	1.00	1132	_		-	-	-	-	_	-	-	_	_	-	-	-	-	-	-	_	-	-	-	-	-	-	-	-
ZZZZZZ	1.00	1135			-	_	-	-	-	_	_	-	-	-	_	-	-	_	-	_	_	-	_	_	-	-	-	-
zzzzzz	1.00	1140			-	-	_	-	-	-	-	-	_	-	-	-	-	-1	-	_	-	-	-	-	-	_	-	-
ZZZZZZ	1.00	1143			-	-	-	-	-	-	-	-	_	-	-		-	-	-	-	-		-	-	-	-	-	-
ZZZZZZ	1.00	1145			-	-	-	-	_	-1	-	-	_	-	_	-	-	-	-	_	_	-	-	_	-	-	-	-
CCV	1.00	1148	<u> </u>		$\overline{\mathbf{x}}$	$\bar{\mathbf{x}}$	$\bar{\mathbf{x}}$	[-]	-	-	-	-1	-1	-	-	-	_	-1	-	-	-	_	-		-	-	~	-
CCB	1.00	1152			X	Х	X	-	-		-	-	_	_	_	-	-	-	_	_	_	-	-	_	-	-	-	-
ZZZZZZ	1.00	1154						-	_	-	~	-	_		-	-	-	_	-	_		-	-	_	-	-	-	-
ZZZZZZ	1.00	1158			-	-	-	-	-	-	-			-	-		_	-	-	-	-	-	-	-	-	-	-	-
ZZZZZZ	1.00	1202			-	-	-	-	_	-	-	-	-	-	_	-	-	-	-	-	-	-	-	-	-	-	-	-
ZZZZZZ	1.00	1205	-		-	-	-	_	-	-	-	-	-	-	_	-	-	-	-	-	-	_	_	-	-	-	-	-[
ZZZZZZ	1.00	1208	_		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ZZZZZZ	1.00	1211			-	-	-	-			-	-	-	-	-	-		-	-	-	-		-	-	-	-	-	-
ZZZZZZ	5.00	1214]-	-	 -	-	-	-	-]	[-]	-	-	-	-	-	-	-	-]-]-	-	-	 -	-	-	-
ZZZZZZ	1.00	1217			-	-	-	-	-	-	-	-	-	-	-	-1	-	-	-	-	-	-	-	-	-	-	-	-
ZZZZZZ	1.00	1222			-	-	-	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ccv —	1.00	1227			\bar{x}	\bar{x}	$\bar{\mathbf{x}}$	-		-	-	-	-	-	-	-	-	-1	-	-	-	-	-	-		-	-	-
CCB	1.00	1232			X		X	-	-	-	-	-	-	-	-	-	-	-	-	-	-		-	-	-	-	-	-
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# 14 ANALYSIS RUN LOG

Lab Name: PARAGON_ANALYTICS	Contract:
Lab Code: NA Case No.:	SAS No.: SDG No.:VASQUE
Instrument ID Number: TJA 61E 4	Method: P_
Start Date: 11/03/98	End Date: 11/03/98

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EPA Sample No.	D/F	Time	} % R	Ā	C	P B				·	.;					}											
ZZZZZZ ZZZZZZ ZZZZZZ CCV CCB	1.00 1.00 1.00 1.00	1235 1238 1241 1244 1249		- - - X	- - - X	- - X X	1 1 1 1	1 1 1 1	11111	11111	.	1 1 1 1	  	- - -	_ _ _ _	1 1 1 1		1 1 1 1	_ _ _ _	1 1 1 1		_ _ _ _			_ _ _ _	1 1 1 1	_    -  -  -  -  -
CCV CCB PBS LCSS	1.00 1.00 1.00 1.00	1558 1601 1604 1607		X X X X	X X X X	х х х х	1 1 1 1	1 1 1 1	1 1 1 1 1	1111	1 1 1 1		1 1 1 1		  	1 1 1 1	11111	1 1 1 1 1	-	1111	  -  -  -  -	_ _ _ _		- - - -	  -  -  -	- - - -	_  -  -  -  -
LCSSD 4940STN 4940STNL 4940STNA 4940STS	1.00 1.00 5.00 1.00	1610 1614 1617 1620 1623		X X X X	X X X X	X X	1 1 1 1	1 1 1 1	11111	1 1 1 1	1 1 1 1	1 1 1 1 1		_ _ _ _	_ _ _ _	1 1 1 1 1	1 1 1 1	1 1 1 1	  	1 1 1 1	_ _ _ _	  	- - - -	_ _ _ _	  -  -  -	1 1 1 1	_ _ _ _ _
4940STE 4771VI-W 4771VI-S CCV CCB	1.00 1.00 1.00 1.00 1.00	1626 1629 1632 1635 1638		X X X X	X X X X	X X X	1 1 1 1		- 1 - 1 - 1	1 1 1 1	1 1 1 1	1 1 1 1 1	1 1 1 1 1	1111	1 1 1 1	1 1 1 1	1 1 1 1	1 1 1 1 1	_ _ _ _	1 1 1 1	_ _ _ _	_ _ _ _	- - - -	_ _ _ _	  		_ _ _ _ _
4771VI-E 4771VI-E ZZZZZZ ICSA ICSAB	1.00 1.00 1.00 1.00 1.00	1641 1644 1647 1650 1653		X X X	$\bar{\mathbf{x}}$	X	1 1 1 1	1 1 1 1	1 1 1 1		1 1 1 1	1 1 1 1	1 1 1 1	1 1 1 1	1 1 1 1		1 1 1 1	1 1 1 1		1 1 1 1	1 1 1 1	_ _ _ _					
CCV	1.00	1656 1701 ——		X - -	х - -	х - -	1111			1 1 1	1111	1 1 1 1		1 1 1	_ _ _ _	1 1 1		1 1 1 1	_ _ _ _	1 1 1	  -  -  -	_ _ _ _	- - -	_ _ _ _	  -  -  -	- - -	- - - -
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# REGION VIII SUMMARY OF DATA QUALITY ASSURANCE REVIEW INORGANIC

TDD No.	Site N	Name :	Operable Unit
75-80914	Vasquez & I-70		
RPM/OSC Name			
Pete Stevenson			
Contractor Laboratory	Contract No.	Report No.	Laboratory DPO/Region
Paragon Analytics, Inc.	OS-98-P-5459	98-10-234	

Review Assigned Date	December 2, 1998	Data Validator	Bill Fear
Review Completion Date	December 21, 1998	Report Reviewer	Amy Ballow

Sample ID	Laboratory ID	Matrix	Analysis
2000 47 N	9810234-1	Filter .	Metals (Arsenic, Cadmium, and Lead) by SW-846 Method 6010
2000 47 E	9810234-2		
2000 47 S	9810234-3		
4691 V1 N	9810234-4		
4691 V1 E	9810234-5		
4691 V1 S	9810234-6		·
4691 V1 N	9810234-7		
4691 VI E	9810234-8		
4691 V1 S	9810234-9		
4691 V1 N	9810234-10		
4691 V1 E	9810234-11	,	
4691 V1 S	9810234-12	·	
4711 TH E	9810234-13		, in the second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second

9810234m Inorganic - 1

9810234m

Sample ID	Laboratory ID	Matrix	Analysis
4711 TH S	9810234-14	Filter	Metals (Arsenic, Cadmium, and Lead) by SW-846 Method 6010
4711 TH N	9810234-15		
4940 ST S	9810234-16	•	
4940 ST N	9810234-17		
4940 ST E	9810234-18	·	
4940 ST N	9810234-19		·
4940 ST S	9810234-20		
4940 ST E	9810234-21		

Inorganic - 2

# DATA QUALITY STATEMENT

() () (X)	Data are ACCEPTABLE according to EPA Functional guidelines with no qualifiers (flags) added by the reviewer.  Data are UNACCEPTABLE according to EPA Functional Guidelines.  Data are acceptable with QUALIFICATIONS noted in review.			
Teleph	none/Communication Logs Enclosed?	Yes	NoX	
TPO A	Attention Required? Yes	NoX_	If yes, list the items that require attention:	

### INORGANIC DATA QUALITY ASSURANCE REVIEW

### **REVIEW NARRATIVE SUMMARY**

This data package was reviewed according to "USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review," February 1994, modified for the method used. Qualification taken on sample results based on the Functional Guidelines that differ from method requirement are identified within the report.

The data package TDD No.75-80914, Report No. 9810234, consisted of 21 filter samples for arsenic, cadmium, and lead analyses by SW-846 Method 6010.

The following table lists the data qualifiers added to the sample analyses. Please see Data Qualifier Definitions, attached to the end of this report.

Sample ID	Elements	Qualifiers	Reason for Qualification	Review Section
98-10-234-3, 98-10-234-10	Cadmium	Ŭ	Blank contamination	VII
98-10-234-21	Lead			

Data Validation Report

	od/SOW Number _SW-846, Method 6010			
Revisi	on			
	Inorganic Deliverables Completeness Che	ecklist		
P P P NA P NA P NA P	Laboratory Control Sample results Standard Addition Results ICP Serial Dilution Results Holding Times Summary Sheet ICP Interelement Correction Factors ICP Linear Ranges Raw Data P Samples P Calibration Standards P Duplicates P ICP QC (ICS and Serial Dilution NA Furnace AA NA Mercury Analysis Percent Solids Calculations - Solids Only	P Blanks P LCS NA Cyanide	<u>P</u> Spi Analysis	kes
<u> P</u>	Sample Description Case Narrative Method References			
KEY: P R NP NR NA	<ul> <li>Provided in original data package, as required by the SOW</li> <li>Provided as Resubmission</li> <li>Not provided in original data package or as resubmission</li> <li>Not required under the SOW</li> <li>Not applicable to this data package or analysis</li> </ul>			

### I. DELIVERABLES

All deliverables	were	present.
------------------	------	----------

Yes

No_X_

Comments:

Prior to submittal for data validation, the laboratory was requested to provide new sample Form 1s with the results reported to the IDLs. (Results were originally reported to the CRDL.) However, the laboratory did not provide a new Form 10 showing the correct IDLs. A Form 10 with correct IDLs was found in SDG 98-10-306. Additionally, new Form 3s for blank contamination in which blank results were reported to the IDL were not provided. The blanks were evaluated to the IDL during validation using the raw data. Refer to the blank section of this data validation report for action taken.

### II. HOLDING TIMES AND PRESERVATION CRITERIA

A11	holding	times	and	preservations	criteria	were	met.
/ NII	HOMBIE	rillico	ullu	Dieser tations	CLICLIA	** CI C	****

Yes __ No_X_

Comments:

The samples were analyzed within holding times. However, according to the case narrative, the samples were received at 17°C. Based on professional judgement, no action was taken.

### III. INSTRUMENT CALIBRATIONS: STANDARDS AND BLANKS

Initial instrument calibrations were performed according to requirements.

Yes X No___

Comments: None.

The instruments were calibrated daily and each time an analysis run was performed.

Yes_X_ No____

Comments: None.

	The instrume	ents were calibrated using one blank and the appropriate number of standards.
	Yes_X_	No
	Comments:	None.
IV.	FORM 1 - S	AMPLE ANALYSIS RESULTS
	Sample analy	ses were entered correctly on Form Is.
	Yes_X_	No
	Comments:	None.
v.	FORM 2A -	INITIAL AND CONTINUING CALIBRATION VERIFICATION
	The initial an requirements.	
	Yes_X_	No
	Comments:	None.
		on verification results were within 90-110% recovery for metals, 85-115% for 80-120% for mercury.
	Yes_X_	No
	Comments:	None.
	The continuing	g calibration standards were run at 10% frequency.
	Yes_X_	No
	Comments:	None.
VI.	FORM 2B - 0	CRDL STANDARD FOR ICP AND AA

# VI.

ICP Analysis: Standards (CRI) at two times the CRDL or the IDL (whichever were greater) were analyzed at the beginning and the end of each sample run, or at a minimum of twice per eight hours, whichever was more frequent.

	Yes_X_	No
	Comments:	A CRDL standard was not required for method 6010.
	GFAA Analy sample run.	sis: Standards (CRA) at two times CRDL were analyzed at the beginning of each
	Yes	No NA_X_
	Comments:	None.
	The CRI and/	or the CRA were analyzed after the ICV.
	Yes	No NA_X_
	Comments:	None.
VII.	FORM 3 - Bl	LANKS
	The initial and	d continuing calibration blanks (ICB and CCB, respectively) met requirements.
	Yes_X_	No
	Comments:	None.
	The continuin	g calibration blanks were run at 10% frequency.
	Yes_X_	No
	Comments:	Continuing calibration blanks were run every 10 samples.
·		preparation blank was run at the frequency of one per twenty samples, or per sample (whichever is more frequent), and for each matrix analyzed.
	Yes_X_	No
	Comments:	None.

All analyzed blank:	s were free o	of contamination.
---------------------	---------------	-------------------

Yes____

No_X_

Comments:

The following table lists the blanks with contamination, elements present, affected samples, and data qualifiers.

### **Blank Contaminants**

Blank ID	Date :	Contaminant	Concentration Found in Blank (ug/L)	IDL (ug/L)	Associated Samples	Concentration Found in Sample (ug/filter)	Qualifier/ Adjustment
ICB	10/23/98	Cadmium	0.47	0.2	98-10-234-3 98-10-234-10	0.02 0.03	U ·
PB	10/26/98	Lead	1.3	1.0	98-10-234-21	0.20	

The blank results reported on the Form 3s were only reported to the CRDL rather than to the IDL. No elements were found above the CRDL. Therefore, the raw data were evaluated in order to obtain values above the IDL. The values reported above were taken from the raw data and above the IDL, but less than the CRDL.

### VIII. FORM 4 - ICP INTERFERENCE CHECK SAMPLE

The ICP interference check sample (ICS) was run twice per eight hour shift and/or at the beginning
and end of each sample set analysis sequence (whichever is more frequent).

Yes_X_

No____

Comments:

None.

Percent recovery of the analytes in solution ICSAB were within the range of 80-120%.

Yes_X_

No____

Comments:

Arsenic, cadmium, and lead recoveries from the ICSAB solution were within QC

criteria. ICSA data were not required for method 6010.

### IX. FORM 5A - MATRIX SPIKE SAMPLE ANALYSIS

A matrix spike sample was analyzed with every twenty or fewer samples of a similar matrix, or one per sample delivery group (whichever is more frequent).

Yes_X_

No____

Comments:

Because these samples are filters and only one filter for each sample was provided the laboratory could not perform a pre-digestion spike. Therefore, the post digestion spikes were evaluated as a pre-digestion spike.

The percent recoveries (%R) were calculated correctly.

% Recovery = 
$$\frac{(SSR - SR)}{SA}$$
 X 100

SSR = spiked sample result

SR = sample result

SA = spike added

Yes_X_ No___

Comments: None.

Spike recoveries were within the range of 75-125% (an exception is granted where the sample concentration is four times the spike concentration).

Yes_X_

No____

Comments:

None.

### X. FORM 5B - POST DIGEST SPIKE RECOVERY

A post-digest spike was performed for those elements that did not meet the specified criteria (i.e., Pre-digestion/pre-distillation spike recovery falls outside of control limits and sample result is less than four times the spike amount added, exception: Ag, Hg).

Yes

No

NA X

Comments:

Post digestion spikes were evaluated as the matrix spikes.

### XI. FORM 6 - DUPLICATE SAMPLE ANALYSIS

Duplicate sample analysis was performed with every twenty or fewer samples of a similar matrix, or one per sample delivery group (whichever is more frequent).

Yes___

No_X_

Comments:

Duplicate data were performed using a laboratory control sample duplicate due to

insufficient sample size. (One filter per sample.)

The RPDs were calculated correctly.

$$RPD = \frac{(S-D)}{(S+D)/2} \times 100$$

S = sample D = duplicate

Yes_X_

No____

Comments:

None.

For sample concentrations greater than five times the CRDL, RPDs were within  $\pm 20\%$  (limits of  $\pm 35\%$  apply for soil/sediments/tailings samples).

Yes_X_

No____

Comments:

None.

For sample concentrations less than five times the CRDL, duplicate analysis results were within the control window of  $\pm$  CRDL (two times CRDL for soils).

Yes_X_

No____

Comments:

None.

# XII. GFAA QC

Duplicate injections were performed on all GFAA samples and the RSD was within  $\pm~20\%$ .

Yes

No

NA X

Comments:

None.

Analytical spikes were performed on all GFAA samples and the percent recovery was 85 - 115%.

Yes____

No____

NA_X_

Comments:

None.

MSAs were analyzed when required and the correlation coefficient was > 0.995.

Yes____

No___

NA_X

Comments:

None.

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# XIII. FORM 7 - LABORATORY CONTROL SAMPLE

	samples of a s	similar matrix, or one per sample delivery group (whichever is more frequent).
	Yes_X_	No
	Comments:	None.
	All results we	re within control limits.
	Yes_X_	No
	Comments:	None.
XIV.	FORM 8 - ST	TANDARD ADDITION RESULTS
	Results from g	graphite furnace standard additions were entered on Form VIII.
	Yes	No NAX
	Comments:	None.
xv.	FORM 9 - IC	P QC
		on was performed for ICP analysis with every twenty or fewer samples of a similar per sample delivery group, whichever is more frequent.
	Yes_X_	No
	Comments:	None.
	The serial dilu	tion was without interference problems.
	Yes_X_	No
	Comments:	None.

The laboratory control sample (LCS) was prepared and analyzed with every twenty or fewer

URS Operating Services, Inc.

XVI.	FORM 10	<ul> <li>QUARTERLY</li> </ul>	INSTRUMENT	<b>DETECTION</b>	LIMITS (IDL)
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	IDLs were provided for all elements on the target analyte list.				
	Yes	No_X			
	Comments:	The Form 10 in the data package did not report the correct IDLs. The correct Form 10 was obtained from SDG 98-10-306 ant attached to the worksheets.			
	Reported IDLs met requirements.				
	Yes_X_	No			
	Comments:	None.			
XVII.	FORM 11 - INTERELEMENT CORRECTION FACTORS FOR ICP				
	Interelement corrections for ICP were reported.				
	Yes_X_	No			
	Comments:	The interelement corrections provided were obtained more than a year prior to sample analysis. No action was required.			
XVIII.	FORM 12 - ICP LINEAR RANGES				
	ICP linear ranges were reported.				
	Yes_X_	No			
	Comments:	The instrument linear ranges were not obtained within three months of sample analysis. No action was required.			
XIX.	LINEAR RANGE VERIFICATION ANALYSIS				
	Linear Range Verification Analysis (LRA) was performed and results were within control limits of $\pm$ 5% of the true value.				
	Yes	No NA_X_			
	Comments:	None.			

### XX. FORM 13 - PREPARATION LOG

	Information or	the preparation of samples for analysis was reported on Form XIII.
	Yes <u>X</u>	No
	Comments:	None.
XXI.	FORM 14 - A	NALYSIS RUN LOG
	A Form XIV w	with the required information was filled out for each analysis run in the data package.
	Yes_X_	No
	Comments:	None.
XXII.	Additional Co	mments or Problems/Resolutions Not Addressed Above

Yes_X No___

Comments: Only the results for arsenic, camium and lead were reported on the Form 1s for

the metal analyses.

#### INORGANIC DATA QUALITY ASSURANCE REVIEW

#### Region VIII

#### DATA QUALIFIER DEFINITIONS

For the purpose of Data Validation, the following code letters and associated definitions are provided for use by the data validator to summarize the data quality. Use of additional qualifiers should be carefully considered. Definitions for all qualifiers used should be provided with each report.

### GENERAL QUALIFIERS for use with both INORGANIC and ORGANIC DATA

- R Reported value is "rejected." Resampling or reanalysis may be necessary to verify the presence or absence of the compound.
- J The associated numerical value is an estimated quantity because the Quality Control criteria were not met.
- U J The reported amount is estimated because Quality Control criteria were not met. Element or compound was not detected.
- N J The analysis indicates the presence of an analyte that has been "tentatively identified" and the associated numerical value represents its approximate concentration.
- N The analysis indicates the presence of an analyte for which there is presumptive evidence to make a tentative identification.
- U The material was analyzed for, but was not detected above the level of the associated value.

  The associated value is either the sample quantitation limit or the sample detection limit.

9810234m Inorganic - 15

#### **ACRONYMS**

AA Atomic Absorption

Ag Silver

CCB Continuing Calibration Blank

CCV Continuing Calibration Verification

CFR Code of Federal Regulations

CLP Contract Laboratory Program

CRA CRDL standard required for AA

CRDL Contract Required Detection Limit

CRI CRDL standard required for ICP

CV Cold Vapor

EPA U.S. Environmental Protection Agency

GFAA Graphite Furnace Atomic Absorption

Hg Mercury

ICB Initial Calibration Blank

ICP Inductively Coupled Plasma

ICS Interference Check Sample

ICSA Interference Check Sample (Solution A)

ICSAB Interference Check Sample (Solution AB)

ICV Initial Calibration Verification

IDL Instrument Detection Limit

LCS Laboratory Control Sample

LRA Linear Range Verification Analysis

MSA Method of Standard Additions

PDS Post Digestion Spike

QC Quality Control

RPD Relative Percent Difference

RPM Regional Project Manager

RSD Percent Relative Standard Deviation

SA Spike Added

SAS Special Analytical Services

SDG Sample Delivery Group

SOW Statement of Work

SR Sample Result

SSR Spiked Sample Result

TPO Technical Project Officer

9810234m Inorganic - 16

EPA	SAMPLE	NO
		NO.

		INORGANIC .	ANALYSES DATA	SHEET	
Lab Name: PAR	AGON ANALYTI	CS	Contract:		2000 47 N
				:	SDG No.: VASQU
Matrix (soil/water): FILTER		<del></del>	_	ole ID: 9810234-1	
Level (low/med					eived: 10/23/98
% Solids:	100.	<del></del>			
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Co	oncentration	Units (ug	/L or mg/kg dry	y weight/	: OG/FILIE <u>K</u>
	CAS No.	Analyte	Concentration	c Q	м
	7440-38-2	Arsenic_	0.30	<u></u> = = = = = = = = = = = = = = = = = = =	P_
	7440-43-9 7439-92-1	Cadmium	0.02		P_ P_
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				_	le ID: 9810234-2
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% Solids:	100.0	0		·	
Conc	centration	Units (ug	/L or mg/kg dry	/ weight):	UG/FILTER
	CAS No.	Analyte	Concentration	C Q	М
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Comments:					

FORM I - IN

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Lab Name: PARA					
Lab Code: NA	Ca	se No.:	SAS No.	:	SDG No.: VASQUE
Matrix (soil/water): FILTER		ER		Lab Samp	ole ID: 9810234-3
Level (low/med	l): LOW_	_		Date Rec	ceived: 10/23/98
% Solids:	100.	0			
Co	ncentration	Units (ug	/L or mg/kg dry	y weight)	: UG/FILTER
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	CAS No.	Analyte	Concentration	C Q	M
	7440-38-2 7440-43-9	ArsenicCadmium	0.30		P_ U.
	7439-92-1	Lead	0.10		P_
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Lab Code: NA	Ca	se No.:	SAS No.	:	SDG No.: VASQUE
Matrix (soil/water): FILTER				Lab Samp	ole ID: 9810234-4
Level (low/med)	): LOW_	<del>-</del>		Date Rec	eived: 10/23/98
% Solids:	100.	0			•
Cor	ncentration	Units (ug	/L or mg/kg dry	y weight)	: UG/FILTER
	CAS No.	Analyte	Concentration	C Q	M
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Lab Name: PARA	AGON_ANALYTI	.cs	Contract: _		. <del></del>	4691 V1 E
Lab Code: NA	Ca	se No.:	SAS No.	: _		SDG No.: VASQUI
Matrix (soil/w	vater): FILT	ER		La	b Sam	ple ID: 9810234-5
Level (low/med	l): LOW_	_		Da	te Re	ceived: 10/23/98
% Solids:	100.	0				
Co	ncentration	Units (ug	/L or mg/kg dry	y w	eight	): UG/FILTE <u>R</u>
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	7439-92-1	Lead	0.12			_ P_
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Tab Name - Dank	001 3111 VmT	90	Contract		4691 V1 S
Lab Name: PARA	GON_ANALYTI	CS	Contract:		
Lab Code: NA	Ca:	se No.:	SAS No.	:	SDG No.: VASQUE
Matrix (soil/water): FILTER		ER		Lab Samp	ole ID: 9810234-6
Level (low/med	): LOW_	_		Date Rec	ceived: 10/23/98
% Solids:	100.	0			·
Co	ncentration	Units (ug	/L or mg/kg dry	y weight)	: UG/FILTER
	CAS No.	Analyte	Concentration	C Q	M
	7440-38-2 7440-43-9 7439-92-1	Arsenic_Cadmium_Lead_	0.30 0.02 0.10	ט	P P P P P P P P P P P P P P P P P P P
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Comments:					·

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Lab Name: PARA	GON_ANALYTI	CS	Contract: _			.
Lab Code: NA	Ca	se No.:	SAS No.	: _		SDG No.: VASQUE
Matrix (soil/w	ater): FILT	ER		Lab	Samp	ole ID: 9810234-7
Level (low/med	l): LOW_	<del></del>		Dat	e Rec	ceived: 10/23/98
% Solids:	100.	0				·
Co	ncentration	Units (ug	/L or mg/kg dr	y we	eight)	: UG/FILTER
	CAS No.	Analyte	Concentration	С	Q	М
	7440-38-2		0.30	1 1		- <del>  P</del>
	7440-43-9	Cadmium	0.02	ַ ט		-   p -
	7439-92-1	Lead	0.10	ן ט  _		P_
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## INORGANIC ANALYSES DATA SHEET

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Lab Name: PARA	GON ANALYTI	CS	Contract:		4691 V1 E
•					SDG No.: VASQUE
Matrix (soil/wa					le ID: 9810234-8
Level (low/med)	): LOW	_		Date Rece	eived: 10/23/98
% Solids:	100.0	)			
Cor	ncentration	Units (ug	/L or mg/kg dry	y weight):	: UG/FILTER
	CAS No.	Analyte	Concentration	C Q	М
	7440-38-2 7440-43-9 7439-92-1	Arsenic_ Cadmium_ Lead	0.30 0.02 0.10	บ	P P P P P P P P P P P P P P P P P P P
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					- 12/14/68
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Comments:	•				

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Lab Name: PARA	GON_ANALYTI	:cs	Contract: _			469	01 V1 S
	_		SAS No.			SDG	No.: VAS
— Matrix (soil/w	- <del></del> -						9810234
Level (low/med							
	_			Da	ice Nec	erveu.	10/23/9
	100.						
Co	ncentration	Units (ug	/L or mg/kg dry	y w	eight)	: UG/F	'ILTE <u>R</u>
	CAS No.	Analyte	Concentration	c	Q	M	
	7440-38-2		0.30			P	
	7440-43-9 7439-92-1	Cadmium_ Lead	0.02			P P P	
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EPA SAMPLE NO.

	21.01.01.	ANALYSES DATA			·
Name: PARAGON ANALYTICS			Contract:		
					ID: 9810234-10
l): LOW_			Date F	Receiv	red: 10/23/98
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CAS No.	Analyte	Concentration	C Q	М	-
7440-38-2 7440-43-9 7439-92-1	Arsenic	0.30	<u>U</u>	P P P P P P P P P P P P P P P P P P P	-lu
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	Cavater): FILT  (1): LOW	Case No.:  Nater): FILTER  Nater): LOW	Case No.: SAS No.  vater): FILTER  1): LOW  100.0  Incentration Units (ug/L or mg/kg dry  CAS No. Analyte Concentration  7440-38-2 Arsenic_ 0.30  7440-43-9 Cadmium_ 0.03  Lead 0.10	Case No.:	Date Receive 100.0  Incentration Units (ug/L or mg/kg dry weight): Units (ug/L or mg/kg dry weight): Units (ug/L or mg/kg dry weight): Units (ug/L or mg/kg dry weight): Units (ug/L or mg/kg dry weight): Units (ug/L or mg/kg dry weight): Units (ug/L or mg/kg dry weight): Units (ug/L or mg/kg dry weight): Units (ug/L or mg/kg dry weight): Units (ug/L or mg/kg dry weight): Units (ug/L or mg/kg dry weight): Units (ug/L or mg/kg dry weight): Units (ug/L or mg/kg dry weight): Units (ug/L or mg/kg dry weight): Units (ug/L or mg/kg dry weight): Units (ug/L or mg/kg dry weight): Units (ug/L or mg/kg dry weight): Units (ug/L or mg/kg dry weight): Units (ug/L or mg/kg dry weight): Units (ug/L or mg/kg dry weight): Units (ug/L or mg/kg dry weight): Units (ug/L or mg/kg dry weight): Units (ug/L or mg/kg dry weight): Units (ug/L or mg/kg dry weight): Units (ug/L or mg/kg dry weight): Units (ug/L or mg/kg dry weight): Units (ug/L or mg/kg dry weight): Units (ug/L or mg/kg dry weight): Units (ug/L or mg/kg dry weight): Units (ug/L or mg/kg dry weight): Units (ug/L or mg/kg dry weight): Units (ug/L or mg/kg dry weight): Units (ug/L or mg/kg dry weight): Units (ug/L or mg/kg dry weight): Units (ug/L or mg/kg dry weight): Units (ug/L or mg/kg dry weight): Units (ug/L or mg/kg dry weight): Units (ug/L or mg/kg dry weight): Units (ug/L or mg/kg dry weight): Units (ug/L or mg/kg dry weight): Units (ug/L or mg/kg dry weight): Units (ug/L or mg/kg dry weight): Units (ug/L or mg/kg dry weight): Units (ug/L or mg/kg dry weight): Units (ug/L or mg/kg dry weight): Units (ug/L or mg/kg dry weight): Units (ug/L or mg/kg dry weight): Units (ug/L or mg/kg dry weight): Units (ug/L or mg/kg dry weight): Units (ug/L or mg/kg dry weight): Units (ug/L or mg/kg dry weight): Units (ug/L or mg/kg dry weight): Units (ug/L or mg/kg dry weight): Units (ug/L or mg/kg dry weight): Units (ug/L or mg/kg dry weight): Units (ug/L or mg/kg dry weight): Units (ug/L or mg/kg dry weight): Units (ug/L or mg/kg dry weight): Units (ug/L or mg/kg dry weight): Units (

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Lab Name: PARA	AGON_ANALYTI	CS	Contract:		4691 V1 E
	_			:	SDG No.: VASQUE
Matrix (soil/w	 vater): FILT	ER		Lab Samp	le ID: 9810234-11
Level (low/med	i): LOW_	_		Date Rec	eived: 10/23/98
% Solids:	100.	0			
Co	oncentration	Units (ug	/L or mg/kg dr	y weight)	: UG/FILTER
	CAS No.	Analyte	Concentration	C Q	M
	7440-38-2	l	0.30 0.02 0.10	<u>u</u>	P P P P P P P P P P P P P P P P P P P
					- R 1211419 K
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Color After:	COLORLESS		ty After: CLE		Artifacts:
Comments:					

		INORGANIC .	1 ANALYSES DATA :	SHÉ	EET	EF	PA SAMPLE N	o. —
Lab Name: PARA	GON_ANALYTI	CS	Contract: _			4	691 V1 S	
Lab Code: NA	Ca	se No.:	SAS No.	: _		SI	G No.: VAS	QUE
Matrix (soil/w	ater): FILT	ER		La	ıb Samp	le I	D: 9810234	-12
Level (low/med	): LOW_	<del></del>		Da	te Rec	eive	d: 10/23/9	8
% Solids:	100.	0 .						
Co.	ncentration	Units (ug	/L or mg/kg dry	7 W	eight)	: UG	/FILTER	
	CAS No.	Analyte	Concentration	С	Q	M		
	7440-38-2	Arsenic	0.30	ਹ		$\left  {P_{-}} \right $		
	7440-43-9 7439-92-1	Cadmium Lead	0.02	U		P_ P_		
	7433-32-1							
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Color Before:	WHITE	Clari	ty Before: N/A		-	Tex	ture: FI	
Color After:	COLORLESS	Clari	ty After: CLEA	AR_	-	Art	ifacts:	
Comments:						_		<u> </u>

FORM I - IN

# 1 INORGANIC ANALYSES DATA SHEET

EPA	SAM	DT.F	NO
DFA	O'LL'		INC).

		INORGANIC	ANALYSES DATA :	SHE	ΞT		
Lab Name: PARA	o Name: PARAGON_ANALYTICS		Contract:			4711 TH E	
			SAS No.	:		SDG No.	: VASQU
Matrix (soil/w						le ID: 98	
						eived: 10	
Level (low/med	_	_		Dat	e kec	erved: 10,	723/30
% Solids:	100.						
Co	ncentration	Units (ug	/L or mg/kg dry	y we	eight)	: UG/FILTI	Ξ <u>R</u>
	CAS No.	Analyte	Concentration	С	Q	M	
	7440-38-2		0.30			P_	
•	7440-43-9 7439-92-1	Cadmium	0.02			P_ P	
						]	
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				- -	-		
						[]	14100
Color Before:	WHITE	Clari	ty Before: N/A			Texture:	FINE
Color After:	COLORLESS	Clari	ty After: CLE	AR_		Artifact	s:
Comments:							;
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#### 1 INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

ab Name: PARA	GON_ANALYTI	CS	Contract:		4711 TH S
	_			:	SDG No.: VASQUE
atrix (soil/w	 ater): FILT	ER	•	Lab Samp	le ID: 9810234-14
evel (low/med	): LOW_	_		Date Rec	eived: 10/23/98
Solids:	100.	0			
Co	ncentration	Units (ug	/L or mg/kg dry	y weight)	: UG/FILTE
	CAS No.	Analyte	Concentration	C Q	M
	7440-38-2 7440-43-9 7439-92-1	Cadmium	0.30 0.02 0.10	ט	P_ P_ P_
					=   A 12/14/94
olor Before:	WHITE	Clari	ty Before: N/A	<u>_</u>	Texture: FINE_
olor After:	COLORLESS	Clari	ty After: CLE	AR_	Artifacts:
omments:					4

EDY	SAMPLE	NIO
EPA	SMALTE	NO.

•						4711 TH N
Lab Name: PARA	GON_ANALYTI	cs	Contract:		<del> </del>	.
Lab Code: NA	Ca	se No.:	SAS No.	: _		SDG No.: VASQU
Matrix (soil/w	ater): FILT	ER		La	b Samp	le ID: 9810234-1
Level (low/med	l): LOW_	_		Da	te Rec	eived: 10/23/98
% Solids:	100.	0				
Co	ncentration	Units (ug	/L or mg/kg dry	y w	eight)	: UG/FILTER
	CAS No.	Analyte	Concentration	С	Q	M
	7440-38-2	Arsenic	0.30	<del>ט</del>		$\left  \frac{1}{P} \right $
		Cadmium	0.02			P_ P_ P_
		1		_		
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•		<u> </u>		$\left  - \right $		-
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·				_		TK 12/14/04
Color Before:	WHITE	Clari	ty Before: N/A			Texture: FINE
Color After:	COLORLESS	Clari	ty After: CLE	AR_	_	Artifacts:
Comments:						
						· · · · · · · · · · · · · · · · · · ·
4						

EPA	SAMPLE	NO.
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ab Name: PAR	AGON ANALYTI	CS	Contract: _			4940 ST S
	_					SDG No.: VASQUE
atrix (soil/v	vater): FILT	ER		Lab	Sampl	e ID: 9810234-16
evel (low/med	d): LOW_	_		Date	e Rece	ived: 10/23/98
Solids:	100.	0				
Co	oncentration	Units (ug	/L or mg/kg dry	y wei	ight):	UG/FILTER_
	CAS No.	Analyte	Concentration	С	Q	M
·	7440-38-2 7440-43-9 7439-92-1	Arsenic_ Cadmium_ Lead_	0.30 0.02 0.10	ט  <u> </u>		P_ P_ P_
		<u> </u>				  
						_ _ _
						#12114/68
olor Before:	WHITE	Clari	ty Before: N/A	l l		\\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\
olor After:	<del></del>	_	ty After: CLE			
omments:						

EPA	SAMPLE	NO.
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						Ì	4940 ST N
Lab Name: PARA	GON_ANALYTI	cs	Contract: _			_  _	-,
Lab Code: NA	Ca	se No.:	SAS No.	: _		S	SDG No.: VASQU
Matrix (soil/w	ater): FILT	ER		La	b Samp	ple	ID: 9810234-1
Level (low/med	): LOW_	_		Da	te Red	ceiv	red: 10/23/98
% Solids:	100.	0					
Co	ncentration	Units (ug	/L or mg/kg dry	y w	eight)	: T	JG/FILTE <u>R</u>
	CAS No.	Analyte	Concentration	С	 Q	М	-
	7440-38-2		0.30			-   <del>-</del>	-
	7440-43-9	Cadmium_	0.02	ט		P P P	
	7439-92-1	Lead	0.10	ן ט		-   P_	<u>.</u>   ·
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							A 12/14/98
Color Before:	WHITE	Clari	ty Before: N/A			Te	exture: FINE
Color After:	COLORLESS	Clari	ty After: CLE	AR_		Ar	tifacts:
Comments:							
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מסם	SAMPLE	MO
EPA	SAMPLE	NO.

ab Name: PARI	AGON ANALYTI	CS	Contract: _		4940 ST E
					SDG No.: VASQUE
atrix (soil/w	<u>.</u>				nple ID: 9810234-18
evel (low/med	i): LOW_	<b>_</b>		Date Re	eceived: 10/23/98
Solids:	100.	0			
Co	ncentration	Units (ug	/L or mg/kg dry	y weight	): UG/FILTER
	CAS No.	Analyte	Concentration	C Q	М
·	7440-43-9 7439-92-1	Arsenic_Cadmium_Lead_	0.30	ַ ַ ַ ַ ַ ַ ַ ַ ַ ַ ַ ַ ַ	P P P P P P P P P P P P P P P P P P P
					=  =   of 12/14/98
olor Before:	WHITE	Clari	ty Before: N/A_		Texture: FINE_
olor After:	COLORLESS	Clari	ty After: CLEA	AR_	Artifacts:
omments:					

		U.S.	EPA - CLP					
		INORGANIC A	1 ANALYSES DATA S	SHE		EPA	SAMPI	LE NO.
Lab Name: PARAC	GON_ANALYTI	cs	Contract: _			49	40 ST	N
Lab Code: NA	Cas	se No.:	SAS No.	: _		SDC	No.:	VASQUE
Matrix (soil/wa	ater): FILT	ER		La	ab Sampl	e II	): 9810	0234-19
Level (low/med)	: LOW_	_		Da	ate Rece	eived	1: 10/	23/98
% Solids:	100.0	0						
Cor	ncentration	Units (ug	/L or mg/kg dry	/ V	weight)	: UG/	FILTE	3
	CAS No.	Analyte	Concentration	С	Q	М		
	7440-38-2 7440-43-9 7439-92-1	Arsenic_ Cadmium_ Lead	0.30 0.02 0.10	U		P P P		
				_ _ _				
				_ _ _				
				_ _ _				·
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				-  -  -				
				-  -  -				
				-  -			1	of 12/14/18
Color Before:	WHITE	Clari	ty Before: N/A		-	Text	ure:	FINE
Color After:	COLORLESS	Clari	ty After: CLE	AR.	_	Art	facts	:
Comments:							<u>``</u>	

	INORGANIC	1 ANALYSES DATA :	SHE	ET	EPA SAM	PLE NO.
Lab Name: PARAGON_ANALYTI	cs	Contract:		<u></u> .	4940 S	T S
Lab Code: NA Ca	se No.:	SAS No.	: _	·	SDG No.	: VASQUE
Matrix (soil/water): FILT	ER		Lal	b Sampl	le ID: 98	10234-20
Level (low/med): LOW_	<del>-</del>		Dat	te Rece	eived: 10	/23/98
% Solids: 100.	0					
Concentration	Units (ug	/L or mg/kg dry	y we	eight):	: UG/FILT	Ξ <u>κ</u>
					[]	
CAS No.	Analyte			Q	М	
7440-38-2		0.30			P P	
7440-43-9 7439-92-1	Cadmium Lead	0.02		<del></del>	P_	
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Color After: COLORLESS	Clari	ty After: CLEA	AR_		Artifacts	3:
Comments:			•			

FORM I - IN

EP	A S	AMPI	ĽΕ	NO.
4	940	ST	E	<del>_</del>

Lab Name: PARA	GON_ANALYTI	cs	Contract: _			4	940 ST	E
Lab Code: NA	Ca	se No.:	SAS No.	· _		SD	G No.:	VASQUE
Matrix (soil/w	ater): FILT	ER		La	b Samp	le I	D: 9810	234-2
Level (low/med	): LOW_			Da	te Rec	eive	d: 10/2	3/98
% Solids:	100.	_						
•			/L or mg/kg dry		eight)	· IIG	/FII.TED	
CO	'	Tonics (ag	· · · · · · · · · · · · · · · · · · ·	, •• — T		. 00 —-	, r 11111 <u>7</u>	-
	CAS No.	Analyte	Concentration	c	Q	М		
	1	Arsenic_	0.30			P_		
•	7440-43-9 7439-92-1	Cadmium	0.02			P_ P_	Ü	
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Color Before:	WHITE	Clari	ty Before: N/A			Tex	ture:	FINE
Color After:	COLORLESS	Clari	ty After: CLE	AR_	<u>.</u>	Art	ifacts:	
Comments:					•	. (	F 12/1-	1184

#### I METAL ANALYSIS WORKSHEET --- HOLDING TIMES

BATCH: 95-10-234

List all analytes which do not meet holding time criteria

SAMPLE	Mati	<u>,                                    </u>	PRE- SERVED	DATE	METALS ANALYSIS	Hg CVAA Analysis	CH	ANALYSIS	NO. OF DAYS PAST HOLDING	
10			Y/N	COLLECTED	DATE/S	DATE	DATE	DATE/S	TIME	V
9 2000 47 0000	£:17	3	DU	1017-98	10-23-10/				-6-1	N
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F: 05	14			<del>                                     </del>				<del> </del>		1
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11	╂╂		<del>                                     </del>	10-69	<del> </del>			<del> </del>	<del></del>	╀
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19	1	7	17	10-21	10-23-53					
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#### Actions

- 1. If holding times are exceeded, all sample results are estimated (J)/(UJ).
- 2. If holding times are grossly exceeded (>= 2*holding time), detected results are estimated (J), and non-detected results are rejected (R).

Validated By:	
B:11 F-	12-14-18

Reviewed By.

Any BALLOW 12-17-98

ANALYTE	HOLDING TIME	PRESERVATIVE	
		AQUEOUS	SOIL
Metals	180 days	pH < 2 w/HN03, 4 Dec. C	4 Deg. C
Mercury	28 days	pH < 2 w/HN03, 4 Dec C	≠ Dea. C
Cyanide	14 days	pH > 12 w/NaOH, 4 Deg. C	4 Deg. C

Date:

#### IIA METAL ANALYSIS WORKSHEET -- IOP CALIBRATIONS

BATCH: 96-10-204

List all ICP analytes that did not meet the percent recovery criteria for initial calibration verification (ICV) and continuing calibration verification (ICV).

NALYTE	CCV	TRUE	FOUND	% R	ACTION	SAMPLES AFFECTED
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s a CBD	l check sa	mole (CBI) a	natured at the	e begigning	and at the en	Tofeach sample sin? You No (an)
MMENT	S	Make (Only a	בשאצפט פו טוי	o ocymning	CLP 40th	d of each sample run? Yes No (WA)
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		<del></del>				

ICV/CCV Actions:

		PERCEN	T RECOVER	RY .	
	<75%	75-89%	90-110%	111-125%	>1259
Detected results	R	J	V	J	F
Non-detected Results	R	UJ	٧	٧	ν.

^{1.} If the instrument was not calibrated daily and each time the instrument was set up qualify the data as rejected (R).

#### IIB METAL ANALYSIS WORKSHEET -- AA CALIBRATIONS

IALYTE CCV TRUE FOUND % R ACTION SAMPI	LES AFFECTED
	<u>-</u>
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	<u>-</u>
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Were the correct number of standards and blanks used to calibrate the instrument	? Yes No
Is the initial calibrations correlation coefficient > 0.935? Yes No	
If no, list affected analytes and samples.	
Was a CRO check sample (CRA) analyzed at the beginning of each sample run?	Yes No
DMMENTS	

ICV/CCV Actions:

PERCENT RECOVERY

<75% 75-89% 90-110% 111-125% >125%

Detected results R J V J R

Non-detected Results R UJ V V V

^{1.} If three standards and a blank were not used for initial call bration, or the instrument was not calibrated daily and each time the instrument was set up, qualify the data as rejected (R).

^{2.} If the initial calibration correlation coefficient was less than 0.995 quality sample results as estimated (J) (UJ).

#### IIC METAL ANALYSIS WORKSHEET -- Hg CALIBRATIONS

BATCH: List all mercury results that did not meet the percent recovery criteria for the ICV and/or CCV standards. CCV TRUE FOUND % R ACTION SAMPLES AFFECTED 1. Were the correct number of standards and blanks used to calibrate the instrument? cvi 2. Is the initial celibration correlation coefficient > 0.995? No If no, list affected samples: 3. Was a CRDL check sample (CRA) analyzed at the beginning of each sample run? Yes No COMMENTS Actions PERCENT RECOVERY <65% 65-79% 80-120% 12" - 135% >:35% Detected results 3 IJ Non-detected results ٧

If four standards and a blank were not used for initial calibration, or the instrument was not calibrated daily and each time the instrument was set up, qualify the data as rejected (R).

If the initial calibration correlation coefficient was less than 1.995, quality sample results as estimated (J)/(UJ).

#### IID METAL ANALYSIS WORKSHEET -- CN CALIBRATIONS

CCA	TRUE	FOUND	%R	ACTION	SAMPLES AFFECTED
001	11105	, , ,	75.1		5,1111 223 141 25125
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					the instument? Yes No
	el calibration ∞		icient > 0.995	? Yes	No
	affected sample				
	derange calibra		and an ICV d	istilled? Yes	No ·
lfno, list	affected sample	≥s:			
MMENT	S				
	· · · · · · · · · · · · · · · · · · ·		·		
ions:			- <del></del>		

	< 70%	/∪~(5-1%)	83-115%	116-130%	>130%
Detected results	R	Ĵ	V	J	R
Non-detected results	R	U:	٧	V	V

^{1.} If three standards and a blank were not used for initial calibration, or the instrument was not calibrated daily and each time the instrument was set up, quaity the data as rejected (R).

2. If the initial calibration correlation coefficient was less than 0.995, classy samples results as estimated (J)/(UJ).

^{3.} If a mid-range standard (or ICV) was not distilled, qualify sample results as estimated (J)/(UJ).

## III METAL ANALYSIS WORKSHEET -- BLANKS

		MATRIX:			usla	BATCH:		
List the h	ilghest	positive AND	negative bl	ank result >=	IDL below.	Use one wo	rksheet for soil matrix and another for	
		CCB	į	]			101 Jennor and an Ornal Jour	water m
ANALY		PB/MB	1	BLANK	l I			
CS			IDL		5 * Bl. Conc.	ACTION	SAMPLES AFFECTED	
		202	0.2	0.47/	2.35	u	3, 10	
<u> </u>	<u>-</u>	cc05	0.2	0.29/	ļ		,	
<b> </b>		COPP		0.32/	<u> </u>	S'ee	ICB	
Cd extr	<del>-  </del>	Cets 1 co	#1	0.26				
C9 CA	Pb	ICB.	0-2	0.74/	1.7		no hind in 24	
Po	,	PB .	4.0	1.3/	6.5	и	21/	<u> )                                   </u>
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			<u> </u>	<u> </u>			Pb = 3 1.0	-/
NOTE:	Verify t	that the abso	iule value c	! any analyte	concentration i	the PB or I	∜3 is < CRDI	
COMM	ENTS	BIA	yes no	+ reporte	L to ID	L 6-1-	to croc	
		revie	cue ed p				60	<u>.</u> .
			-ples,		· 7 1~~	<b>←</b> CO,	PB + CCBs brackets	

((2)	(1/2) PB-OK	orly	21	;5	ω(	(1/2) 03
(10)	ar wo					(0/26 PB)

^{1.} If [Blank] < IDL, no action is taken.

^{2.} If Blank > = IDL, then all sample results > = IDL and < 5*Blank are non-detected (U).

^{3.} If Blank = < -IDL and raw data sample results = < IDL and < 5* |Blank| are estimated (J).

4. If Blank = < -IDL and raw data sample result is = < IDL then non-detected results are estimated (UJ).

SAMPLE

ID

COMMENTS

**ANALYTE** 

#### IVA METAL ANALYSIS WORKSHEET -- ICP INTERFERENCE CHECK SAMPLE

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COMMENTS

NOTE: The sample results can be accepted without qualification. If the sample concentrations of Al, Ca, Fe, and Mg are less than or equal to the concentration found. In the ICSA solution.

Examine the sample results in ug/l and list any Al, Ca, Fe, or Mg results that are greater than the ICSA values.

ICS

VALUE

SAMPLE

**RESULT** 

				· · · · · · · · · · · · · · · · · · ·		
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				•		
201100011400	in the ICS AR colu	tion that did not n	act the criteria of $80-1$	20% R.		
ariy ariarytes	III IIIe IOS AD SOID	COLLEGE CITAL COLLEGE	eet the chiana of oo - t			
			eet the criteria of 80-1 SAMPLE			
	% R	ACTION		SAFFECTED		
ANALYTE			SAMPLE	SAFFECTED		
ANALYTE	% R					
ANALYTE			SAMPLE	SAFFECTED		
ANALYTE	% R		SAMPLE	SAFFECTED		
ANALYTE	% R		SAMPLE:	SAFFECTED		
ANALYTE	% R		SAMPLE:	SAFFECTED		
ANALYTE	% R		SAMPLE:	SAFFECTED		
ANALYTE	% R		SAMPLE:	SAFFECTED		
ANALYTE	% R		SAMPLE:	SAFFECTED  CL, Ph.		
ANALYTE	% R		SAMPLE:	SAFFECTED  CL, Ph.		
ANALYTE	% R		SAMPLE:	SAFFECTED  CL, Ph.		

Actions:					
	F	PERCENT	REC	OVERY	
	<50%	50-79%	8	0-12%	>120%
Defected results	R	J	•	V	J
Non-detected results	R	UJ		V	V

of twice per 8-hour shift (whichever is more frequent)?

Were Interference Check Samples run at the beginning and end of each sample analysis run, or a minimum

No

#### IVB METAL ANALYSIS WORKSHEET -- ICP INTERFERENCE CHECK SAMPLE

BATCH: Report the concentration of any analytes detected in the ICSA solution > [IDL] that should not be present SAMPLE/ SAMPLE/ SAMPLE/ **ICSA** SAMPLE/ SAMPLE/ RESULT ANALYTE ACTION RESULT RESULT RESULT RESULT RESULT

#### Actions:

If the ICSA value > the positive IDL:

- 1. For non-detected results, no action is taken.
- 2. Estimate (J) all detected results <= 5*ICSA.

If the ICSA value < -IDL:

- 1. Estimate (J) detected results <= 5* | ICSA|.
- 2. Estimate (W) non detected results.

### V METAL ANALYSIS WORKSHEET -- PRE-DIGESTION MATRIX SPIKE

	MATRIX:	Filter		BATCH:					
are not e	neters that do valuated for Ca e result exceed	L Mg. K. Na.	AL and Fe to	r soll sample	es, and Ca, N	Ag, K, and Na	n spîke re a for wate	covery criteria samples.	
SAMPLE ID	ANALYTE	SPIKED SAMPLE RESULT	SAMPLE RESULT	SPIKE ADDED	% R	ACTION	SAMP	LES AFFECTE	)
	Recover	es for	As,	CDJ	05	. 1 1	·n+=	<u> </u>	
<del></del>	_ i3	bota	pust	Spike	1-4	21	<u> </u>	·	
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	<del> </del>		<u> </u>			1	<u> </u>	<del></del>	<del></del>
<u> </u>	<del>-</del>		<u> </u>			<del> </del>		<del></del>	
		!							
	<u> </u>				-	i	1		
		<u>:</u> :	<u>:</u>	<del> </del>	!				
1. Was a	pre-digestion ever is more fre	matrix spike	orepared at Yes	the required	frequency of	once every	20 sample	es, or every SDC	3
2. Was a	post-digestion ery criteria?	n matrix spike Yes	analyzed fo	x all ICP eie	ments, excep	: Silver, that	did not me	eet the pre-dig	estion matrix spik
COMMEN		165	15	(0.54	301 CE 100			<del> </del>	
	<i>[47</i>	coulze	605	t SDir	ونے سرام	due	10	1;m,-tcb	Schole
<b></b>	size (	(Flex)		<del> </del>					
			<del></del>						
1. If any a	inalyte does no	t meet the %	R criteria, c	ualify all asso	opiated samp	ies using the	following	criteria:	
Actions.			Percent Re			•		•	
Detected (	results ected results	<30% J R	30-74% J UJ	75 – 125% V V	>125% J V				

#### VI METAL ANALYSIS WORKSHEET -- LABORATORY DUPLICATES

MATRIX: F-\k/5 List all parameters that do not meet % difference or CRDL criteria.						BATCH:			
SAMPLE ID	ANALYTE	SAMPLE	DUP. VALUE	RPD	DIFFERENCE	ACTION	SAMPLES AFFECTED		
		LC3/LC	عمدل د	u/,	~ 20.(				
		/							
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			1				:		
COMMENT	s Pe	(60-e2 0 / 1 6:14e	LCS	Lesi	7 64	· 40	Scrophy crt		
	4. \ 10-> ~	1 6-140	1 Se-ple	<b></b>		·			
Actions:						<del></del>			

#### 1. AQUEOUS

If sample value > 5*CRDL, estimate (J) all sample results of the same matrix if the RPD is > 20%.

If sample value < 5*CRDL, and the difference between the duplicate and the original is > CRDL, estimate (J)/(LU) all sample results of the same matrix.

### 2. SOUD

If sample value > 5*CRDL, estimate (J) all sample results of the same matrix if the RPD is > 35%.

If sample value < 5*CRDL, and the difference between the duplicate and the criginal is > 2*CRDL, estimate (J)/(W) all sample results of the same matrix.

*Difference = [Sample result - Duplicate sample result]

### VII METAL ANALYSIS WORKSHEET -- LABORATORY CONTROL SAMPLES

MATRIX: BATCH:  Lost all parameters that do not meet the percent recovery criteria.  LOS TRUE FOUND							
List all parame	ters that do no	t meet the per	cent recovery	criteria.			
ID ID	ANALYTE	VALUE	VALUE	% R	ACTION	SAMPLES AFFECTED	
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COMMENTS	<del></del>		<del></del>			1	
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<u> </u>	<del></del>	<del></del>			······································		
<b>——</b>	<del></del>	<del></del>		<del></del>	<del></del>		
<del></del>	<del></del>					· · · · · · · · · · · · · · · · · · ·	
Actions:		<del></del>		····	<del></del>		
	ntimony and si	wer have no c	ontrol limits. A	th aqueous LC	S is not require	ed for CN and mercury.	
				PERCENTRE	COVERY	. •	
1. AQUEOUS Detected r			<50% R	50-79% J	80-120% V		
	cted results		R	์ นัก	V	J V	
				,			
2. SOLID LO	3		BELOW		WITEN	AROVE	
			CONTROLL		CONTROLL	ABOVE MITS CONTROLLIMITS	
Detected i			j	. •	ν'	J	
Non-deta	ected results		UJ		V	V	

#### VIIIA METAL ANALYSIS WORKSHEET -- ANALYTICAL SPIKE ANALYSIS

BATCH: __ List all samples whose analytical spike recovery did not meet the 85-115 % recovery criteria. SPIKED TRUE SAMPLE SAMPLE SAMPLE SPIKE ANALYTE ID RESULT RESULT VALUE %R ACTION COMMENT 1. Spike Recovery: One point analytical spikes were performed for all GFAA samples? No. COMMENTS If the sample result is <50% of the spike result, or the sample result is >50% of the spike result

PERCENT RECOVERY

Actions: <10% 10-84% 85-115% >115%

Detected results J J V J

Non-detected results R UJ V V

*Spike result = |spiked sample result |

and the percent recovery is <40% or between 85-115%, the following apply.

BATCH:

## VIIIB METAL ANALYSIS WORKSHEET -- FURNACE AA ANALYSIS

	SAMPLE	1st CORR	2nd, CORR. COEFF.	ACTION	d, or MSA results were outside control limits.  COMMENT
WALYTE	<u>lD</u>	COEFF.	COEFF.	ACTION_	COLANAICIAI
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				<del></del>	
1				l _	<u>                                     </u>

Estimate (J) if an MSA was required and not performed.

2. If the correlation coefficient was <0.995/the MSA should be performed a second time. Estimate (J) all sample results. if a reanalysis was not performed, or the reanalysis correlation coefficient was < 0.995, or result from the highest correlation coefficient was not reported.

List all samples > CRDL whose duplicate injections did not agree within 20% RSD cr CV, or samples in which duplicate injections were not performed /

	SAMPLE	SAMPLE	DUPLICATE	%RSD	-		
ANALYTE	ID /	RESULT	RESULT	or CV	CRDL	ACTION	COMMENT
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						<u> </u>	
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		<u> </u>		<u>.                                    </u>		i	1

*Spike result = |spiked sample result - sample result|

- 1. Estimate (J) detected results greater than the CRDL if duplicate injections are outside 20% RSD.
- 2. Estimate (J) all sample results if duplicate injections were not performed.

# IX METAL ANALYSIS WORKSHEET --- ICP SERIAL DILUTION ANALYSIS

at dilution criteria only apolles if the original sample result is at least 50" DL. SAMPLE SERIAL DILUTION RESULT % D ACTION SAMPLES AFFECTED  NALYTE IDL 50°DL RESULT % D ACTION SAMPLES AFFECTED  DILUTION RESULT % D ACTION SAMPLES AFFECTED  DILUTION SAMPLES AFFECTED  ACTION SAMPLES AFFECTED  DILUTION SAMPLES AFFECTED  DILUTION SAMPLES AFFECTED  DILUTION SAMPLES AFFECTED  ACTION SAMPLES AFFECTED  DILUTION SAMPLES AFFECTED  DILUTION SAMPLES AFFECTED  ACTION SAMPLES AFFECTED  DILUTION SAMPLES AFFECTED  DI		MATRIX:	Follow					BATCH:
NALYTE IDL SO*DL SAMPLE DILLTION RESULT %D ACTION SAMPLES AFFECTED  SO*TOL SO*TOL SO*TOL SO*TOL SAMPLES AFFECTED  DUCTIVELY COUPLED PLASMA SERIAL DILLTION ANALYSIS: rial dilutions were performed by each matrix and results of the diluted searners analysis agreed within ten percent of the riginal undiluted analysis. If so No and a serial dilutions were not performed by each matrix and results of the diluted searners analysis agreed within ten percent of the riginal undiluted analysis. If so No analysis and results of the diluted searners analysis agreed within ten percent of the riginal undiluted analysis. If so No analysis agreed within ten percent of the riginal undiluted analysis. If so No analysis agreed within ten percent of the riginal undiluted analysis.	erial dilution o	riteria only	applies if the	original samp	le result is at le	ast 50*IDL a	ind %D >109	%. 
NALYTE IDL SO*DL RESULT RESULT % D ACTION SAMPLES AFFECTED    Company   Comp		•		SAMPLE				
DUCTNELY COUPLED PLASMA SERIAL DILLITION ANALYSIS:  rial dilutions were performed for each matrix and results of the diluted sample analysis agreed within ten percent of the  riginal undiluted analysis. Yes No  rial dilutions were not performed for the following:  DMMENTS SD on Serial 1 2 2	ANALYTE	IDL	50*1DL	RESULT	RESULT	% D	ACTION_	SAMPLES AFFECTED
DUCTNELY COUPLED PLASMA SERIAL DILLITION ANALYSIS:  rial dilutions were performed for each matrix and results of the diluted sample analysis agreed within ten percent of the  riginal undiluted analysis. Yes No  rial dilutions were not performed for the following:  DMMENTS SD on Serial 1 2 2	·			$\rightarrow$				
DUCTNELY COUPLED PLASMA SERIAL DILUTION ANALYSIS:  rial dilutions were performed for each matrix and results of the diluted sample analysis agreed within ten percent of the  riginal undiluted analysis. As No  rial dilutions were not performed for the following:  DMMENTS SD on Se-pre 1 2 2 [				<del></del>				<del>  \</del>
DUCTIVELY COUPLED PLASMA SERIAL DILLITION ANALYSIS:  rial dilutions were performed to each matrix and results of the diluted sample analysis agreed within ten percent of the  riginal undiluted analysis. If so No   rial dilutions were not performed for the following:  DMMENTS SD ON SO-PY 1 2 2		AND		<u> </u>	<u> </u>		/	D-/
DUCTIVELY COUPLED PLASMA SERIAL DILUTION ANALYSIS:  At all dilutions were performed by each matrix and results of the diluted sample analysis agreed within ten percent of the virginal undituted analysis. At so No at all dilutions were not performed for the following:  DIMMENTS SD ON Semple 1 2 2			POSTOC			/		
DUCTIVELY COUPLED PLASMA SERIAL DILUTION ANALYSIS:  Axial dilutions were performed to each matrix and results of the diluted sample analysis agreed within ten percent of the original undiluted analysis. Yes No exial dilutions were not performed for the following:  DMMENTS  SD  O  S—P  1 2 2						(	1/0.	
DUCTIVELY COUPLED PLASMA SERIAL DILUTION ANALYSIS:  Axial dilutions were performed to each matrix and results of the diluted sample analysis agreed within ten percent of the original undiluted analysis. Yes No exial dilutions were not performed for the following:  DMMENTS  SD  O  S—P  1 2 2						<del></del>	<del>  \</del>	
DUCTIVELY COUPLED PLASMA SERIAL DILUTION ANALYSIS:  Axial dilutions were performed to each matrix and results of the diluted sample analysis agreed within ten percent of the original undiluted analysis. Yes No exial dilutions were not performed for the following:  DMMENTS  SD  O  S—P  1 2 2			<u></u>					
DUCTIVELY COUPLED PLASMA SERIAL DILUTION ANALYSIS:  Axial dilutions were performed to each matrix and results of the diluted sample analysis agreed within ten percent of the original undiluted analysis. Yes No exial dilutions were not performed for the following:  DMMENTS  SD  O  S—P  1 2 2							-	
DUCTIVELY COUPLED PLASMA SERIAL DILUTION ANALYSIS:  Axial dilutions were performed to each matrix and results of the diluted sample analysis agreed within ten percent of the original undiluted analysis. Yes No exial dilutions were not performed for the following:  DMMENTS  SD  O  S—P  1 2 2							<del> </del>	
DUCTIVELY COUPLED PLASMA SERIAL DILUTION ANALYSIS:  Axial dilutions were performed to each matrix and results of the diluted sample analysis agreed within ten percent of the original undiluted analysis. Yes No exial dilutions were not performed for the following:  DMMENTS  SD  O  S—P  1 2 2		<del></del>	<u> </u>				<del></del>	
DUCTIVELY COUPLED PLASMA SERIAL DILUTION ANALYSIS:  Axial dilutions were performed to each matrix and results of the diluted sample analysis agreed within ten percent of the original undiluted analysis. Yes No exial dilutions were not performed for the following:  DMMENTS  SD  O  S—P  1 2 2		<del></del>	}					
DUCTIVELY COUPLED PLASMA SERIAL DILUTION ANALYSIS:  Axial dilutions were performed to each matrix and results of the diluted sample analysis agreed within ten percent of the original undiluted analysis. Yes No exial dilutions were not performed for the following:  DMMENTS  SD  O  S—P  1 2 2							<u> </u>	
DUCTIVELY COUPLED PLASMA SERIAL DILUTION ANALYSIS:  Axial dilutions were performed to each matrix and results of the diluted sample analysis agreed within ten percent of the original undiluted analysis. Yes No exial dilutions were not performed for the following:  DMMENTS  SD  O  S—P  1 2 2			<del> </del>	<u> </u>	<del> </del>	}	<del> </del>	<del></del>
DUCTIVELY COUPLED PLASMA SERIAL DILUTION ANALYSIS:  Axial dilutions were performed to each matrix and results of the diluted sample analysis agreed within ten percent of the original undiluted analysis. Yes No exial dilutions were not performed for the following:  DMMENTS  SD  O  S—P  1 2 2						<del></del>	<del> </del>	
DUCTIVELY COUPLED PLASMA SERIAL DILUTION ANALYSIS:  Axial dilutions were performed to each matrix and results of the diluted sample analysis agreed within ten percent of the original undiluted analysis. Yes No exial dilutions were not performed for the following:  DMMENTS  SD  O  S—P  1 2 2	<del></del>		<del> </del>				<u> </u>	
DUCTIVELY COUPLED PLASMA SERIAL DILUTION ANALYSIS:  Axial dilutions were performed to each matrix and results of the diluted sample analysis agreed within ten percent of the original undiluted analysis. Yes No exial dilutions were not performed for the following:  DMMENTS  SD  O  S—P  1 2 2			<del> </del>	ļ		<del> </del>	1	
DUCTIVELY COUPLED PLASMA SERIAL DILUTION ANALYSIS:  Axial dilutions were performed to each matrix and results of the diluted sample analysis agreed within ten percent of the original undiluted analysis. Yes No exial dilutions were not performed for the following:  DMMENTS  SD  O  S—P  1 2 2	<del></del>			<del> </del>			1	<del> </del>
erial dilutions were performed for each matrix and results of the diluted sample analysis agreed within ten percent of the priginal undiluted analysis. Fires No exial dilutions were not performed for the following:  OMMENTS SDOON S—PYC 122				<u> </u>	<del> </del>		1 .	
erial dilutions were performed for each matrix and results of the diluted sample analysis agreed within ten percent of the priginal undiluted analysis. Fires No exial dilutions were not performed for the following:  OMMENTS SDOON S—PYC 122			<del> </del>	<u> </u>	ļ	<u> </u>	1	
erial dilutions were performed for each matrix and results of the diluted sample analysis agreed within ten percent of the priginal undiluted analysis. Fires No exial dilutions were not performed for the following:  OMMENTS SDOON S—PYC 122		·	<del> </del>		<del>-</del>	<u> </u>	<u>.</u>	
erial dilutions were performed for each matrix and results of the diluted sample analysis agreed within ten percent of the priginal undiluted analysis. Fires No exial dilutions were not performed for the following:  OMMENTS SDOON S—PYC 122			<del> </del>	<del> </del>	<del> </del>		1	
erial dilutions were performed for each matrix and results of the diluted sample analysis agreed within ten percent of the priginal undiluted analysis. Fires No exial dilutions were not performed for the following:  OMMENTS SDOON S—PYC 122		<del> </del>	-	<del> </del>		<u> </u>	· l	<del></del>
erial dilutions were performed for each matrix and results of the diluted sample analysis agreed within ten percent of the priginal undiluted analysis. Fires No exial dilutions were not performed for the following:  OMMENTS SDOON S—PYC 122	INDUCTMEN	COURTER	PLASMA SE	BIAL DILLITIC	N ANALYSIS	<u> </u>	!	1
original undiluted analysis. Kes No exial dilutions were not performed for the following:  OMMENTS SD on S-p/2 1 2 21	Serial dilution	is were perf	ormed for ea	ch matrix and	results of the c	liuted samp	le analysis ag	greed within ten percent of the
OMMENTS SD on Se-ple 1221	original und	iluted analy	sis. Kes	No				
	ින්නේ රෝග්රීර් 	is were <b>n</b> ot	beuoused to	r the following	) <b>:</b>		•	
	COMMENTS	4	2000	هـعک	he 1	15-6		
		· · · · · · · · · · · · · · · · · · ·					•	

Actions

Estimate (J) detected results if %0 is > 10%.

# X METAL ANALYSIS WORKSHEET -- SAMPLE RESULT VERIFICATION

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BAICH:
. Describe any raw data anomalies (i.e. baseline shifts, negative absorbances, transcription or calculation errors, legibility, etc.)
· · · · · · · · · · · · · · · · · · ·
List results that fall outside the linear range of the ICP Instrument or the calibrated range of the AA or Cyanide Instrument
and were not reanalyzed.
3. Were ICP linear ranges obtained within 3 months of, and preceding, the sample analyses? - Yes No NA 4.4.1 3
Were ICP interelement corrections obtained within 12 months of, and preceding, the sample analyses? Yes NO NA
just over liver
5. Were Instrument detection limits present, found to be less than or equal to the CRDL, and obtained within 3 monts of, and preceed
the sample analyses? (Per Dit NA Not-1: 3 months 2/1195 w/2
The Capit
6. Were all sample results reported down to the IDL? (es) No - IDL - CEPC D
3. Wele all sample results reported cowin to the IDE1 1839 110 200 1710
7. Were sample weights, volumes, percent solids, and dilutions used correctly when reporting the results? Yes No
COMMENTS
"No. From 10 Fund \$ in other 506 56-10-306
"New Form 10 Funds in other 5017 98-10-306
D Lob wis regulated to resoluit Form Is ul results
reporter to the IDL. However, the Form 35 For blanks
ver only reported to CROC. (Used row dita) of 110 & A new
Furn 10 was not provided we was Found in SOK 90-10-306
torse to mis were bearing one mil being the sex to make a
0.14
As. IOL = 3.0 ugl 3.0 ugl x Trilter = 0.3 ug/F.
J.
<del></del>

# 10 Instrument Detection Limits (Quarterly)

Lab Name:	PARAGON_AN	ALYTICS		Contract	:	
Lab Code:	NA	Case No.:		SAS No.:	<del></del>	SDG No.: VASQUE
ICP ID Num	ber:	TJA_61	E_4	Date:	10/15/98	8
Flame AA I	D Number :					
Furnace AA	ID Number	•				
						•
Comments:	Analyte  Arsenic Cadmium Lead	Wave- length (nm) 189.04 226.50 220.35		CRDL (ug/L)  10 5 3	IDL (ug/L)  3.0 0.2 1.0	P
			· · · · · · · · · · · · · · · · · · ·			
					•	

# 10 Instrument Detection Limits (Quarterly)

Lab Name: PARAGON_ANALYTICS	Contract:	
Lab Code: NA Case No.:	SAS No.: SDG No.: VASQ	UE
ICP ID Number: TJA_61E	Date: 02/01/98	
Flame AA ID Number :		
Furnace AA ID Number :		

, <del></del>	<del>,</del>		r	T	
Analyte	Wave- length (nm)	Back- ground	CRDL (ug/L)	IDL (ug/L)	М
Arsenic	189.04	<del></del>	10	10.0	P
Cadmium	226.50			5.0	P
Lead	220.35			3.0	P -
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Comments:	,	

# 11A ICP INTERELEMENT CORRECTION FACTORS (ANNUALLY)

Lab Name:	PARAGON_ANA	LYTICS	Contr	act:	<u></u>	
Lab Code:	NAC	ase No.:	SAS N	o.:	SDG No	.: VASQUE
ICP ID Num	ber: TJA 61	E	Date:	10/01/	97	
1	Wassa	T	nterelement	Correction	Frators for	
Analyte	Wave- length (nm)	Al		Fe		BA_
Arsenic_Cadmium_Lead	189.04 _226.50 _220.35	0.0000000 -0.0000000 -0.0003640	_0.0000000 _0.0000000 _0.0000130_	0.0000000 0.0000600 0.0000630		_0.0000000
Comments:				•		

# 11B ICP INTERELEMENT CORRECTION FACTORS (ANNUALLY)

ab Name: 1	PARAGON_ANA	LYTICS	Contr	act:		
ab Code: 1	NAC	ase No.:	SAS N	o.:	SDG No	.: VASQUE
CP ID Numb	oer: TJA 61	E	Date:	10/01/	97	
	Wave- length		nterelement			
Analyte	(nm)	CO_	CR_	MN_	NI_	v
Arsenic Cadmium Lead	189.04 226.50 220.35	0.0000000	-0.0029800_ _0.0000000_ _0.0000000_	0.0000000	_0.0000000 _0.0000000 _0.0002430	_0.0000000
omments:	1				l	
				•		

# 12 ICP LINEAR RANGES (QUARTERLY)

Lab Name: PARAC	GON_ANALYTI	cs	Contract:		<del></del>	
Lab Code: NA	Case 1	No.:	SAS No.:		SDG No.:	VASQUE
ICP ID Number:	TJA 61E	<del></del>	Date:	02/01/9	98	
					·	
	Analyte	Integ. Time (sec.)	Concentration (ug/L)	М		
	Arsenic_Cadmium_Lead	15.00 15.00 15.00	10000.0 10000.0 10000.0	_ _P_		
						·
•						
Comments:						·
			•			

FORM XII - IN

# 13 PREPARATION LOG

Lab	Name:	PARAGON_AN	ALYTICS	Contract:	 ·
Lab	Code:	NA	Case No.:	SAS No.: _	SDG No.: VASQUE

Method: P_

			<del>,</del>
EPA Sample	Dranamation	Weight	Volume
-	Preparation		1
No.	Date	(gram)	(mL)
2000 47_	_10/23/98	_1.00_	100
2000 47	_10/23/98	1.00	100
2000 47	_10/23/98	_1.00_	100
4691 V1	_10/23/98	_1.00_	100
4691 V1	_10/23/98	1.00	100
4691 V1	10/23/98	1.00	100
4691 V1	_10/23/98	1.00	100
4691 V1	_10/23/98	1.00	100
4691 V1	10/23/98	1.00	100
4691 V1	_10/23/98	1.00	100_
4691 V1	_10/23/98	1.00	100
4691 V1		1.00	100
4711 TH	10/23/98	1.00	100
4711 TH	10/23/98	1.00	100
4711 TH	10/23/98	1.00	100
4940 ST	10/23/98	1.00	100
4940 ST	10/23/98	_1.00_	100
4940 ST	10/23/98	_1.00_	100
4940 ST	10/23/98.	1.00	100
4940 ST	10/23/98	1.00	100
4940 ST	10/23/98	1.00	
LCSS	10/23/98.	1.00	<u> </u>
LCSS -	10/23/98	1.00	
LCSSD	10/23/98	-1:00-	₁₀₀ -
LCSSD -	10/23/98	-1:00-	100
PBS —	10/23/98	-1.00-	100
PBS —	10/23/98	-1.00-	
	_10/23/30	— <u>+</u>	
<del></del>			
<b> </b>		<u> </u>	
_ <del></del>			
l		· · ·	

### 14 ANALYSIS RUN LOG

Lab Name:	PARAGON_ANALYTICS	Contract:	
Lab Code:	NA Case No.:	SAS No.:	SDG No.: VASQUE
Instrument	ID Number: TJA 61E	Method: P_	

Start Date: 10/23/98

End Date: 10/23/98

EPA														An	al	yte	s										
Sample	D/F	Time	ે ક	R	A	C	Р				$\neg$	7	$\neg$	T	Т	$\top$	T	Π	Г	Π	Γ	Г					Г
No.	•				s	D	В				1		- 1	١				1	Ì								
MIX	1.00	0932	[	<del></del>	$ \bar{x} $	$\bar{x}$	$\bar{\mathbf{x}}$	-	-	-	-	-	-	-[	- -	- -	-	[-	-	-	-	_	-	-	-	-	-
MIX	1.00	0934			X	X	Х		-	_		-1	-	-1.	- -	- -	-	-		-	-	_	-	_	-	-	-
ICV	1.00	0939	l ——		X	Х	Х	_	-	-	-	-	-	-1.	- -	- -	-	-	i –	-	-	_	-	_	-	-	_
ICB	1.00	0944			X	X	X	_	-	-	-	-	-1	- -	-1-	- -	1-	\ <u> </u>	-	-	-		-	-	-	-	-
ZZZZZZ	1.00	0946			1			-	-	-1	-	-	-	- -	- -	- -	-	-	-	-	-	-	-	-	-	-	_
ICSA	1.00	0949			X	$\bar{x}$	$ \bar{\mathbf{x}} $	_	-	-1	-	-	-	- -	- -	- -	-	_	-	-	-	-	-	_	-	-	_
ICSAB	1.00	0952			X	X	X	-1	-	-	-	-1	-1	-1.	-1-	- -	1-	-	-	_	-			-	<b>-</b> [	-	<u> </u>
CCV	1.00	0954			X		Х		-	-1	-1		-	- -	- -	- -	-	_	-	-	-	_	-	-	-	-	_
CCB	1.00	1001			X		Х	-[	-1	-1	-1	-1	-	-1-	- -	-1-	-	-	<b>–</b>	-	-	-	-	-	-	-	_
ZZZZZZ	1.00	1004	-					-	-	-	-1	-	-	- :	- -	- -	-	-		-	-	-	_	-	-	-	_
ZZZZZZ	1.00	1006			-	-	-	-	-	-	-1	-	-	- -	- -	-1-	-	-	_	-	-	-	-	-	-	-	_
ZZZZZZ	1.00	1009			-	-	-	-	-	-1	-{	-	-	-1-	- -	-{-	-	-		-	-	-	-	-1	-1	-	_
ZZZZZZ	1.00	1016			-	-	-	-	-	-1	-	-1	-1	-[-	-1-	- -	-		_	-	-	-	-	-	-	-	_
ZZZZZZ	1.00	1018			-	_	-	-	-	-	-	-	-	- -	- -	- -	-	-	-	-	-	-	-	-	-	-	_
ZZZZZZ	5.00	1021			-	-	-	-	-	-	-1	-	-	- -	- -	- -	-	-	-	-	-	-	-	-	-	-	_
ZZZZZZ	1.00	1024		~	-	-		-	-1	-	-	-	-	- -	- -	- -	-	-	_		-	-	-	-	-	-	_
222222	1.00	1026			-		-	-	-	-	-	-1	-1	- -	- -	- -	-	-	_	-	-	-	-	-	-	-1	
ZZZZZZ	1.00	1031			-	_	-	-	-]	-	-[	-	-	- -	- -	- -	-	-	-	-	-	-	-	-	-	-1	_
ZZZZZZ	1.00	1033			-	-	-	-	-	-	-	-	-	- -	- -	- -	-	-	-	-	-	-	-	-1	-1		_
ccv -	1.00	1036			$\overline{\mathbf{x}}$	$\bar{\mathbf{x}}$	$\bar{\mathbf{x}}$	-	_	-	-	-1	-	- -	-   -	- -	-	1-1	_	_	-	_	_	_	-	-	_
CCB	1.00	1039			X	x	X	-	-	-	-1	-	-	- -	- -	- -	-	-	-	-	-	-	-	-	-	-	_
ZZZZZZ	1.00	1042						-	-1	-	-	-1	-	- -	- -	- -	-	-	-	-	-	-	_	-	-1	-	_
ZZZZZZ	1.00	1044	-		-	-	_	-1	-	-	_	-	-	-1-	- -	- -	-		-	-	_		-	-	-	_	_
ZZZZZZ	1.00	1047			-		-	-1	-	-1	-	-1	-	- -	- -	- -	-	-	_		-	_	_	_	-[	-	_
ZZZZZZ	1.00	1050			-	-	-	-	-	-	-	-\	-1	- -	- -	- -	-	-	_	-		-	-	-	_		_
ZZZZZZ	1.00	1052			-	-	_	-	-	-	-	-1	-	- -	- -	- -	-	-	_		-	-	-	-	-	-	<u> </u>
ZZZZZZ	1.00	1055			-	_	-	-	-	-	-1	-	-1	- -	- -	- -	-	-	1	-	-	-	-	-	-	-	_
ZZZZZZ	1.00	1057			-	-	-	-1	-	-1	-1	-1	-1	-1-	-1-	- -	-	-	-	-	-		-	-	-	-	-
ZZZZZZ	1.00	1100			-	-	-	-	-	-	-,	-1	-	- -	- -	- -	-	-	_	-	-	-	-	-	-	-1	<del>-</del>
ZZZZZZ	1.00	1103			-	-	-	-1	-	-	-	-	-1	- -	- -	- -	-	-	-	-	-	-	-	-	-	-	_
ZZZZZŻ	1.00	1105			-	-	-	-	-	-	-	-1	-	- -	- -	- -	-	-	_	1-1	-	-	-	-	-	-	-
CCV	1.00	1108			$\overline{\mathbf{x}}$	$\bar{\mathbf{x}}$	$\bar{\mathbf{x}}$		-	-	-	-	-	- -	- -	- -	-	-	<b>—</b>	-	-	-	-		-	-	<del>-</del> .
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# 14 ANALYSIS RUN LOG

Lab Name: PARAGON_ANALYTICS	Contract:
Lab Code: NA Case No.:	SAS No.: SDG No.:VASQUE
Instrument ID Number: TJA 61E	Method: P_
Start Date: 10/23/98	End Date: 10/23/98

EPA														Ar	na.	Lyt	ces	3										
Sample	D/F	Time	٥	R	A	C	P	_				_	Ι			Γ	Ι				П		Γ-	Г			-	┌'
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CCB	1.00	1112			$\overline{\mathbf{x}}$	$\bar{\mathbf{x}}$	$\overline{\mathbf{x}}$	<u> </u>	-	-	_	_		_	_	<u></u>	_	_	_	_	_		_	_	-	-	-	-
222222	1.00	1114				_	_				_			-					_		_		_	_	-		-	-
ZZZZZZ	1.00	1117			I_	lΞ									_										[		-	-
ZZZZZZ	1.00	1122																					_		-	-		-
ZZZZZZ	1.00	1124			-		-			-		_		-							_	1	_	-	-	-	-	-
ZZZZZZ	5.00	1127			-	_	-	_	_	_	_	_	_	_	_	_		_	_	_	_	_	-	-	-	-	-	-
ZZZZZZ	1.00	1129				[_		_		_		_	[	_	_		<u> </u>			_		_		I_	_		-	-
ZZZZZZ	1.00	1132		<u> </u>	_	]_	-	_	-	_				-	_		_	_			]	_	_	-		_	-	-
ZZZZZZ	1.00	1137			-	<u> </u>	_			_				_	_	_	-	_	_	_			_	_	-	-	-	-
ZZZZZZ	1.00	1139		<del></del>	-	[	-		_			<u>-</u>		-	_		_					_		_		-	-	-
ZZZZZZ	1.00	1142			-	-	-		-	_	_	_		-							-	_	_		_		1	-
ccv	1.00	1144			$\bar{x}$	$\overline{\mathbf{x}}$	$\bar{\mathbf{x}}$	_	_	_		_			_	_	_	_	_	_			_	_	-	_	-	-
CCB.	.1.00	1148			X	X	X		-		_		-	_	-	-			_	_	-	1		_	-	-	-	-
ZZZZZZ	1.00	1151						_	_	_		_	_	<b>-</b> .	-	_	-					-	_	_	-	_	-	-
ZZZZZZ	1.00	1153			-	-	-		-		_	_	<del>-</del>	<del>-</del>	-	-	-	_ :	_	_	-	-	-	_	-	_	_	
ZZZZZZ	5.00	1156			-	-	-	_	_	_		_	-	-	-	-	-		_		_	-	_	-	-	-	-	-
ZZZZZZ	1.00	1159			-	-	-	_	_	_	_	_	_	_		_	_		_		_	_		_	-	_	_	-
ZZZZZZ	1.00	1201			-	-	-	_	-	_	-	_	-	_		_		-	_	_	-		-	_	-	-	_	-
ZZZZZZ	1.00	1207			-	-	-	_	-	_	_	_	_	_	-	_	_	_	-	Į	-	-		_	-	-	-	-
zzzzzz	1.00	1213		<del></del>	-	-	-	_	-	_	-1	_	_	-	-	_	-	_	-	_	-	-	_	_	-	-	_	-
ZZZZZZ	1.00	1216	-		-	-	-	_	_	-	_	-	_	-	_	_	-	-	-1		-	_	-	-	-	-	-	-
CCV	1.00	1219			X	$\overline{\mathbf{x}}$	$\overline{\mathbf{x}}$	_	-	_	-	-		_	-	_	-	_	_	-	-	-	_	-	-	-	_	-
CCB	1.00	1224			x	X	х	_	_	_	-	_	_	_	_	_	-	_			[-	-	_	-	-			-
CCV	1.00	1446			X	Х	Х	_	-	-	-	_	_	_	_	_	-	_	-	_	-	-	-	_	-	-	-	-
CCB	1.00	1450			X	Х	Х	-	-	-	-	-	_		-	_	-	_	-	_	-	-	-	_	-	-	-	-
PBS	1.00	1452			X	Х	Х	_	-		-	-	-	-	-	-	-	-	-	_	-		-	-	-	-	-	-
LCSS	1.00	1455			X		х	_	-	-	-	-	_	-	-	_	_		-	_	—	-		-	-	-	-	-
LCSSD	1.00	1458			x	Х	х	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		-	-	-	-	-
2000 47	1.00	1502			X	X	x	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		-	-	-	-	-
2000 47	5.00	1505			X	X	x	-		-	-,	-	-	_	-		-	-	-	-	-	-		-	-	-	-	-
2000 47	1.00	1507			X	X	x	-	-	-	-	-	-		-	_		-		<b>—</b>	-	-		-	-	-	-	
2000 47	1.00	1512			X	X	X		-	-	-		] — '		-	-	-	-		<b> </b> —	-	-	-	-	-	-	-	-
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# 14 ANALYSIS RUN LOG

Lab Name: PARAGON_ANALYTICS	Contract:
Lab Code: NA Case No.:	SAS No.: SDG No.:VASQUE
Instrument ID Number: TJA 61E	Method: P_
Start Date: 10/23/98	End Date: 10/23/98

Τ	<del>                                     </del>	<del></del>	Τ		T									Αı	na.	lyt	tes							_				
EPA Sample	D/F	Time	ءِ ا	R	Ā	C	P		_	_	1	T			Ι	- T	_	Γ-	r		Τ		_	γ	ι –		_	_
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4691 V1	1.00	1517			X	x	X	-		-	-	-	-	-	-	-	-		Ι-,	_	-	-		-	-	-	_	-
4691 V1	1.00	1520			X	X	X	-	-	_	_	-	-	-	-	-	-	_	_	_	_	-	-	-	-	-	_	-
CCV	1.00	1522			X	X	X	_	-		[ -	-	_	-	-	-	-	-	-	_	-	-	_	-	-	[-]	_	_
CCB	1.00	1526			$\mathbf{x}$	X	X	<b> </b>	-	-	_	-	-	[-	_	[-	-	-	_	1	-	_	-	_	-	[-[	~	-
4691 V1	1.00	1529			X	X	X	-	-	-	_	-	-	-	_	-	_	-	-	_	-	_	-	-	-	-	~	-
4691 V1	1.00	1531			X	X	Х	-	-	-	-	-	-	-	_	-	_	-	_	1	-	-	-	-	-	-	-	-
4691 V1	1.00	1534			$ \mathbf{x} $	X	X	-	-	-	_	_	_	-	1	-	-	-	-	_	-	_	-	-	-	-	-	
4691 V1	1.00	1537	l —		X	X	X	_	-	[-	-	-	-	-	_	-	_	_	-	_	-	_	-	-	-	-	_	-
4691 V1	1.00	1539			X	X	X	_	-		_		-	-	-	-	_	_	_	_	-	_	-	<b>-</b>	-	[-[	_	-
4691 V1	1.00	1542			X	X	X	-	_	-	-	-	-	-	-	-	-	_	_	_	-		-	_	-	-	$\overline{}$	-
4691 V1	1.00	1544			X	X	X	_	_	-	_	-	-	-	-	-	-	1	_	_	-	_	-	_	-	-	_	-
4711 TH	1.00	1547			X	X	X	-	-	-		-	_	-	-	-	-	_	-	_	_	_	-	-	-	-	-	-
4711 TH	1.00	1550			X	X	X	-	<b> </b> —	-	_	-	_	-	<u></u>	-	-	_	-	_	-	_	-	_	-	-	_	-
4711 TH	1.00	1552	] ——		X	X	X	_	-	_	_	-	-	-	-1		-	<b>-</b>	-	-	-	_	-	·	-	-	-	-
CCV	1.00	1555			X	X	Х	-	-	-	-	-	-	-	-	-	-	-	-	-		-	-	-	-	-	-	-
CCB	1.00	1559	l		X	X	Х	-	-	-	-	-	-	-		-	-	-	-	-	-	-	-	_	-	-	-	-
4940 ST	1.00	1602	l		X	X	Х	-	-	-	-	-	-	-	-1	-	-	-	-1	-1	-	-	-	-	-	-	-	-
4940 ST	1.00	1604			X	X	х	-	-	-	-	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
4940 ST	1.00	1607			X	X	Х	-	-	-	-	-			-	-	-	-	-	-	-	-	_	-	_	-	-	-
4940 ST	1.00	1609			X	X	Х	-	-	-	_	_		-		-	-	-	-	-1	-	-	-	-	-	-	-	-
4940 ST	1.00	1612			X	X	х	-		-	-	-		-	-	-	-	-	-	-	-	-	-	_	-	-	-	-
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ICSAB	1.00	1623			X.	x	Х	-	-	-	-	-	-	-	-	-	-	-	-	-		-	-	_	-	-		-
CCV	1.00	1626			X	X	X	-	-	-	-	-	-	-	-	-		<b>-</b>	-	-	-	-	-	-	-	-	-	-
CCB	1.00	1630	l		X	X		-	-	-	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
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#### 14 ANALYSIS RUN LOG

Lab Name: PARAGON_ANALYTICS	Contract:
Lab Code: NA Case No.:	SAS No.: SDG No.:VASQUE
Instrument ID Number: TJA 61E	Method: P_
Start Date: 10/26/98	End Date: 10/26/98

Start Date: 10/26/98 Analytes **EPA** Sample D/F Time % R C D В No.  $\bar{\mathbf{x}} \bar{\mathbf{x}}$ MIX 1.00 1150  $|\mathbf{x}|\mathbf{x}$ X MIX 1152 1.00 1.00 ICV X 1155 X X x | x | xICB 1.00 1201 ZZZZZZ 1.00 1204  $\overline{\mathbf{x}}$  $\overline{\mathbf{x}}$  $\bar{\mathbf{x}}$ 1206 **ICSA** 1.00 X X X ICSAB 1.00 1209 x | x | xCCV 1.00 | 1212 CCB 1217 x | x | x1.00 PBS 1.00 X X X 1220 Х  $\mathbf{x} \mathbf{x}$ LCSS 1.00 1223  $\mathbf{X} \mid \mathbf{X}$ LCSSD 1225 X 1.00 4940 ST 1.00 1230 X

# 14 ANALYSIS RUN LOG

Lab Name: PARAGON_ANALYTICS	Contract:
Lab Code: NA Case No.:	SAS No.: SDG No.:VASQUE
Instrument ID Number: TJA 61E	Method: P_
Start Date: 10/26/98	End Date: 10/26/98

EPA														Aı	na.	Lyt	es	3										T
Sample No.	D/F	Time	96	R	Ā	C D	P B																					
CCB	1.00	1343			$\bar{x}$	$\bar{x}$	$\bar{\mathbf{x}}$	_	_	-			  -	<u>-</u>	-  -	-	_	_	-  -	-  -	-   -	_	  -	<u>-</u>	-	_	_	-
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# TECHLAW INC.

PHONE: (303) 763-7188

FAX: (303) 763-4896

December 21, 1998

Ms. Lori Raschke URS Operating Services, Inc. 1099 18th Street, Suite 710 Denver, CO 80202

RE: Transmittal of Data Validation Report

Vasquez and I-70 TDD No. 75-80914 Report No. 302244

Dear Ms. Raschke:

Please find the enclosed data validation report for TDD No. 75-80914 for the Vasquez and I-70 project. This report is for the validation of five filter samples for metals (arsenic, cadmium, and lead) analyses by SW-846 methods.

If you have any questions regarding the enclosed report, please contact me at (303) 763-7188.

Yours sincerely,

TECHLAW, INC.

Lisa Burnley

Associate Consultant

enclosure IF: 0252-176

# REGION VIII SUMMARY OF DATA QUALITY ASSURANCE REVIEW INORGANIC

TDD No.	Site 1	Name	Operable Unit
75-80914	Vasquez & I-70		
RPM/OSC Name	]		
Pete Stevenson			
Contractor Laboratory	Contract No.	Report No.	Laboratory DPO/Region
Quanterra, Inc.	OS-98-P-5436	302244	

Review Assigned Date	December 2, 1998	Data Validator	Bill Fear
Review Completion Date	December 21, 1998	Report Reviewer_	Amy Ballow

Sample ID	Laboratory ID	Matrix	Analysis
ND-FC-01	302244-0001	Filter	Metals (Arsenic, Cadmium, and Lead) by SW-846 Method 6010B
ND-FC-02	302244-0002		
ND-FC-03	302244-0003		
ND-FC-04	302244-0004		
ND-FC-05	302244-0012		

# DATA QUALITY STATEMENT

(X)	Data are ACCEPTABLE according to by the reviewer.	EPA Function	nal guidelines with no qualifiers (flags) added
()	Data are UNACCEPTABLE according Data are acceptable with QUALIFICA	•	
Teleph	none/Communication Logs Enclosed?	Yes	NoX
TPO A	Attention Required? Yes	NoX	If yes, list the items that require attention:

#### INORGANIC DATA QUALITY ASSURANCE REVIEW

#### **REVIEW NARRATIVE SUMMARY**

This data package was reviewed according to "USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review," February 1994, modified for the method used. Qualification taken on sample results based on the Functional Guidelines that differ from method requirement are identified within the report.

The data package TDD No.75-80914, Report No. 302244, consisted of 5 filter samples for arsenic, cadmium, and lead analyses by SW-846 Method 6010B.

The following table lists the data qualifiers added to the sample analyses. Please see Data Qualifier Definitions, attached to the end of this report.

Sample ID	Elements	Qualifiers	Reason for Qualification	Review Section
None	None	None	None	None

302244m Inorganic - 3

Metho	od/SOW Number SW-846, Method 6010		
Revisi	onB		
	Inorganic Deliverables Completeness Che	ecklist	
<u>P</u>	Inorganic Cover Page		
<u>P</u> _			
<u>P</u>	Initial Calibration and Calibration Verification Results		
<u>P</u> _	Continuing Calibration Verification Results		
	CRDL Standard for ICP and AA		
	Blank Analysis Results		
	ICP Interference Check Sample Results		
	Spiked Sample Results		
	Post-digest spiked Sample Analysis		
<u>P</u>	•		
	Instrument Detection Limits		
	Laboratory Control Sample results		
	Standard Addition Results		
	ICP Serial Dilution Results		
	Holding Times Summary Sheet		
	ICP Interelement Correction Factors		
	ICP Linear Ranges		
<u>P</u> _	Raw Data		
	P Samples P Calibration Standards		Blanks <u>NP</u> Spikes
	P Duplicates P ICP QC (ICS and Serial Dilution		LCS
	NA Furnace AA NA Mercury Analysis	NA	Cyanide Analysis
NA	Percent Solids Calculations - Solids Only	•	
<u>P</u>	Sample Prep/Digestion Logs		
<u>P</u>	Analysis Run Log		
P P P P	Chain-of-Custody		
<u>P</u>	Sample Description		
<u> </u>	Case Narrative		
<u>P</u>	Method References		
KEV			
KEY:	Described in solicited days and the control of the GOW		
P	= Provided in original data package, as required by the SOW		
R	= Provided as Resubmission		
NP ND	= Not provided in original data package or as resubmission		
NR	= Not required under the SOW		
NA	= Not applicable to this data package or analysis		

# I. DELIVERABLES

	All deliverable	es were present.
	Yes	No_X_
	Comments:	The summary forms provided for the calibrations, blanks, and interference check samples did not correspond to the raw data. Therefore, the raw data were used to evaluate this data. Matrix spike analyses could not performed on these filter samples.
II.	HOLDING T	IMES AND PRESERVATION CRITERIA
	All holding tin	nes and preservations criteria were met.
	Yes_X_	No
	Comments:	The samples were analyzed within holding times. No shipping or receiving problems were noted.
III.	INSTRUMEN	T CALIBRATIONS: STANDARDS AND BLANKS
	Initial instrume	ent calibrations were performed according to requirements.
	Yes_X_	No
	Comments:	None.
	The instrument	ts were calibrated daily and each time an analysis run was performed.
	Yes_X_	No
	Comments:	None.
	The instrument	s were calibrated using one blank and the appropriate number of standards.
	Yes_X_	No
	Comments:	None.

III.

# IV. FORM 1 - SAMPLE ANALYSIS RESULTS

	Sample analyse	es were entered correctly on Form Is.
	Yes_X_	No
	Comments:	None.
v.	FORM 2A - II	NITIAL AND CONTINUING CALIBRATION VERIFICATION
	The initial and requirements.	I continuing calibration verification standards (ICV and CCV, respectively) men
	Yes_X_	No
	Comments:	None.
		n verification results were within 90-110% recovery for metals, 85-115% for 0-120% for mercury.
	Yes_X_	No
	Comments:	None.
	The continuing	calibration standards were run at 10% frequency.
	Yes_X_	No
	Comments:	None.
VI.	FORM 2B - C	RDL STANDARD FOR ICP AND AA
	analyzed at the	Standards (CRI) at two times the CRDL or the IDL (whichever were greater) were beginning and the end of each sample run, or at a minimum of twice per eight er was more frequent.
	Yes	No NAX
	Comments:	A CRDL standard was not required for method 6010.

VII.

GFAA Analys sample run.	sis: Standards (CRA) at two times CRDL were analyzed at the beginning of each
Yes	No NA_X_
Comments:	None.
The CRI and/o	or the CRA were analyzed after the ICV.
Yes	No NA_X_
Comments:	A CRI was analyzed but the data were not summarized as this analysis was not required for this method.
FORM 3 - BI	ANKS
The initial and	continuing calibration blanks (ICB and CCB, respectively) met requirements.
Yes_X_	No
Comments:	None.
The continuing	g calibration blanks were run at 10% frequency.
Yes_X_	No
Comments:	Continuing calibration blanks were run every 10 samples.
	reparation blank was run at the frequency of one per twenty samples, or per sample (whichever is more frequent), and for each matrix analyzed.
Yes_X_	No
Comments:	None.
All analyzed b	lanks were free of contamination.
Yes_X_	No
Comments:	None.

#### VIII. FORM 4 - ICP INTERFERENCE CHECK SAMPLE

The ICP interference check sample (ICS) was run twice per eight hour shift and/or at the beginning and end of each sample set analysis sequence (whichever is more frequent).

Yes_X_ No__

Comments: None.

Percent recovery of the analytes in solution ICSAB were within the range of 80-120%.

Yes_X_ No___

Comments: Arsenic, cadmium, and lead recoveries from the ICSAB solution were within QC

criteria. No action was required for the ICSA analysis

#### IX. FORM 5A - MATRIX SPIKE SAMPLE ANALYSIS

A matrix spike sample was analyzed with every twenty or fewer samples of a similar matrix, or one per sample delivery group (whichever is more frequent).

Yes___ No_X_

Comments: Matrix spike analyses were not performed. Apparently, because these samples are

filters and only one filter for each sample was provided, the laboratory could not perform matrix spike analyses. The laboratory analyzed two laboratory control

samples to evaluate the data for accuracy.

The percent recoveries (%R) were calculated correctly.

% Recovery = 
$$\frac{(SSR - SR)}{SA}$$
 X 100

SSR = spiked sample result

SR = sample result

SA = spike added

Yes___ No___ NA_X_

Comments: None.

Spike recoveries were within the range of 75-125% (an exception is granted where the sample concentration is four times the spike concentration).'

Yes___ No___ NA_X

Comments: Matrix spike analyses could not be performed due to insufficient sample amounts.

# URS Operating Services, Inc.

#### FORM 5B - POST DIGEST SPIKE RECOVERY

A post-digest spike was performed for those elements that did not meet the specified criteria (i.e., Pre-digestion/pre-distillation spike recovery falls outside of control limits and sample result is less than four times the spike amount added, exception: Ag, Hg).

Yes

No____

NA X

Comments:

Post digestion spikes were not performed.

#### FORM 6 - DUPLICATE SAMPLE ANALYSIS XI.

Duplicate sample analysis was performed with every twenty or fewer samples of a similar matrix, or one per sample delivery group (whichever is more frequent).

Yes

No_X_

Comments:

Duplicate data were performed using a laboratory control sample duplicate due to insufficient sample size. (One filter per sample.)

The RPDs were calculated correctly.

 $RPD = \frac{(S - D)}{(S + D)/2} \times 100$ 

S = sample

D = duplicate

Yes_X_

No____

Comments:

None.

For sample concentrations greater than five times the CRDL, RPDs were within  $\pm 20\%$  (limits of ±35% apply for soil/sediments/tailings samples).

Yes_X_

No____

Comments:

None.

For sample concentrations less than five times the CRDL, duplicate analysis results were within the control window of  $\pm$  CRDL (two times CRDL for soils).

Yes_X_

No____

Comments:

None.

XIII.

XIV.

# XII. GFAA QC

Duplicate inje	ctions were perf	formed on all GFAA samples and the RSD was within $\pm 20\%$ .
Yes	No	NA_X_
Comments:	None.	
Analytical spil	ces were perform	ed on all GFAA samples and the percent recovery was 85 - 115%.
Yes	No	NA_X_
Comments:	None.	
MSAs were an	nalyzed when red	quired and the correlation coefficient was > 0.995.
Yes	No	NA_X_
Comments:	None.	
FORM 7 - LA	BORATORY (	CONTROL SAMPLE
		e (LCS) was prepared and analyzed with every twenty or fewer one per sample delivery group (whichever is more frequent).
Yes_X_	No	
Comments:	None.	
All results wer	e within control	limits.
Yes_X_	No	
Comments:	None.	
FORM 8 - ST	ANDARD ADD	ITION RESULTS
Results from g	raphite furnace s	standard additions were entered on Form VIII.
Yes	No	NA_X_
Comments:	None.	

## XV. FORM 9 - ICP QC

A serial dilution was performed for ICP analysis with every twenty or fewer samples of a similar matrix, or one per sample delivery group, whichever is more frequent.

Yes_X_ No___

Comments: A serial dilution was performed, however, the serial dilution data were not

reported or required as cadmium, lead, and arsenic were reported as non-detected

in the original sample analyses.

The serial dilution was without interference problems.

Yes_X_ No___

Comments: None.

## XVI. FORM 10 - QUARTERLY INSTRUMENT DETECTION LIMITS (IDL)

IDLs were provided for all elements on the target analyte list.

Yes___ No_X_

Comments: Only the reporting limits were provided. IDLs and CRDLs were not provided for

these 6010 analyses.

Reported IDLs met requirements.

Yes X No No

Comments: Required IDLs were not provided for validation.

#### XVII. FORM 11 - INTERELEMENT CORRECTION FACTORS FOR ICP

Interelement corrections for ICP were reported.

Yes___ No_X_

Comments: The interelement corrections provided were not provided. Interference was

evaluated using the interference check samples.

URS Operating Services, Inc.

XVIII. FO	ORM 12	- ICP	LINEAR	RANGES
-----------	--------	-------	--------	--------

	ICP linear ran	nges were reported.					
	Yes	No NAX_					
	Comments:	The instrument linear ranges were not provided or required as all samples results were below the reporting limits.					
XIX.	LINEAR RA	NGE VERIFICATION ANALYSIS					
	Linear Range of ± 5% of the	Verification Analysis (LRA) was performed and results were within control limits the true value.					
	Yes	No NAX					
	Comments:	None.					
XX.	FORM 13 - P	REPARATION LOG					
	Information on the preparation of samples for analysis was reported on Form XIII.						
	Yes_X_	No					
	Comments:	A digestion log was provided.					
XXI.	FORM 14 - A	NALYSIS RUN LOG					
	A Form XIV v	with the required information was filled out for each analysis run in the data package.					
	Yes_X_	No					
	Comments:	Instrument run logs were provided.					
XXII.	Additional Co	omments or Problems/Resolutions Not Addressed Above					
	Yes_X_	No					
,	Comments:	Only the results for arsenic, cadmium and lead were reported on the Form 1s for theses filter metal analyses.					

# INORGANIC DATA QUALITY ASSURANCE REVIEW

#### Region VIII

#### DATA QUALIFIER DEFINITIONS

For the purpose of Data Validation, the following code letters and associated definitions are provided for use by the data validator to summarize the data quality. Use of additional qualifiers should be carefully considered. Definitions for all qualifiers used should be provided with each report.

# GENERAL QUALIFIERS for use with both INORGANIC and ORGANIC DATA

- R Reported value is "rejected." Resampling or reanalysis may be necessary to verify the presence or absence of the compound.
- The associated numerical value is an estimated quantity because the Quality Control criteria were not met.
- U J The reported amount is estimated because Quality Control criteria were not met. Element or compound was not detected.
- N J The analysis indicates the presence of an analyte that has been "tentatively identified" and the associated numerical value represents its approximate concentration.
- N The analysis indicates the presence of an analyte for which there is presumptive evidence to make a tentative identification.
- U The material was analyzed for, but was not detected above the level of the associated value.

  The associated value is either the sample quantitation limit or the sample detection limit.

302244m Inorganic - 13

#### **ACRONYMS**

AA Atomic Absorption

Ag Silver

CCB Continuing Calibration Blank

CCV Continuing Calibration Verification

CFR Code of Federal Regulations

CLP Contract Laboratory Program

CRA CRDL standard required for AA

CRDL Contract Required Detection Limit

CRI CRDL standard required for ICP

CV Cold Vapor

EPA U.S. Environmental Protection Agency

GFAA Graphite Furnace Atomic Absorption

Hg Mercury

ICB Initial Calibration Blank

ICP Inductively Coupled Plasma

ICS Interference Check Sample

ICSA Interference Check Sample (Solution A)

ICSAB Interference Check Sample (Solution AB)

ICV Initial Calibration Verification

IDL Instrument Detection Limit

LCS Laboratory Control Sample

LRA Linear Range Verification Analysis

MSA Method of Standard Additions

PDS Post Digestion Spike

QC Quality Control

RPD Relative Percent Difference

RPM Regional Project Manager

RSD Percent Relative Standard Deviation

SA Spike Added

SAS Special Analytical Services

SDG Sample Delivery Group

SOW Statement of Work

SR Sample Result

SSR Spiked Sample Result

TPO Technical Project Officer

302244m Inorganic - 14



Client Name: URS Operating Services, Inc. Client ID: ND-FC-01
Lab ID: 302244-0001-SA
Matrix: FILTER Sampled: Sampled: 15 OCT 98 Prepared: See Below Received: 22 OCT 98 Analyzed: See Below Authorized: 22 OCT 98

Parameter	Result	Units	Reporting Limit	Analytical Method	Prepared Date	Analyzed Date
Arsenic Cadmium Lead	ND ND ND	total ug total ug total ug	0.20	6010B 6010B 6010B	22 OCT 98	22 OCT 98 22 OCT 98 22 OCT 98

ND = Not detected NA = Not applicable

Reported By: Wennilyn Fua

Approved By: Mei Lai

The cover letter is an integral part of this report.

Rev 230787

R 12/21/88



Client Name: URS Operating Services, Inc. Client ID: ND-FC-02 Lab ID: 302244-0002-SA

Sampled: 15 OCT 98 Prepared: See Below Received: 22 OCT 98 Analyzed: See Below Matrix: FILTER Authorized: 22 OCT 98

Parameter	Result	Units	Reporting Limit	Analytical Method	Prepared Date	Analyzed Date
Arsenic Cadmium Lead	ND ND ND	total ug total ug total ug	0.20	6010B 6010B 6010B	22 OCT 98	22 OCT 98 22 OCT 98 22 OCT 98

ND = Not detected NA = Not applicable

Reported By: Wennilyn Fua

Approved By: Mei Lai

The cover letter is an integral part of this report. Rev 230787

R 12/21/14



Client Name: URS Operating Services, Inc. Client ID: ND-FC-03
Lab ID: 302244-0003-SA
Matrix: FILTER Sampled: Sampled: 15 OCT 98 Prepared: See Below Received: 22 OCT 98 Authorized: 22 OCT 98 Analyzed: See Below

Parameter	Result	Units	Reporting Limit	Analytical Method	Prepared Date	Analyzed Date
Arsenic Cadmium Lead	ND ND ND	total ug total ug total ug	0.20	6010B 6010B 6010B	22 OCT 98	22 OCT 98 22 OCT 98 22 OCT 98

R- 12/21/18

ND = Not detected NA = Not applicable

Reported By: Wennilyn Fua

Approved By: Mei Lai

The cover letter is an integral part of this report. Rev 230787



Client Name: URS Operating Services, Inc. Client ID: ND-FC-04

Lab ID:

302244-0004-SA

Matrix: FILTER Authorized: 22 OCT 98

Sampled: 16 OCT 98 Prepared: See Below

Received: 22 OCT 98 Analyzed: See Below

Parameter	Result	Units	Reporting Limit	Analytical Method	Prepared Date	Analyzed Date
Arsenic Cadmium Lead	ND ND ND	total ug total ug total ug	0.20	6010B 6010B 6010B	22 OCT 98	22 OCT 98 22 OCT 98 22 OCT 98

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ND = Not detected NA = Not applicable

Reported By: Wennilyn Fua

Approved By: Mei Lai

The cover letter is an integral part of this report. Rev 230787



Client Name: URS Operating Services, Inc. Client ID: ND-FC-05
Lab ID: 302244-0005-SA

302244-0005-SA FILTER Sampled: 16 OCT 98 Prepared: See Below Received: 22 OCT 98 Analyzed: See Below Matrix: Authorized: 22 OCT 98

Parameter	Result	Units	Reporting Limit	Analytical Method	Prepared Analyzed Date Date
Arsenic	ND	total ug	0.20	6010B	22 OCT 98 22 OCT 98
Cadmium	ND	total ug		6010B	22 OCT 98 22 OCT 98
Lead	ND	total ug		6010B	22 OCT 98 22 OCT 98

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ND = Not detected NA = Not applicable

Reported By: Wennilyn Fua

Approved By: Mei Lai

The cover letter is an integral part of this report. Rev 230787

# I METAL ANALYSIS WORKSHEET -- HOLDING TIMES

302244

& islitti

Ust all analytes which do not meet holding time criteria

SAMPLE ID	Matix	PRE- SERVED Y/N	DATE COLLECTED	METALS ANALYSIS DATE/S	Hg CYAA ANALYSIS DATE	CN ANALYSIS DATE	ANALYSIS DATE/S	NO. OF DAYS PAST HOLDING TIME	AC
10-FC-O1	Kilk	NW	ICIETO/	/10-22-98				~ 0-	1
-02		11		,			ļ	1	1
-o3	7-1-			7				1	1-
-04	1-1-		10-14					1-1	<del> </del>
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ctions:							<del></del>		

- 1. If holding times are exceeded, all sample results are estimated (J)/(UJ).
- 2. If holding times are grossly exceeded (>= 2*holding time), detected results are estimated (J), and non-detected results are rejected (R).

٧a	lida	ated	Bv.	
Ve	HOG	ile C	BV.	

Date:

Reviewed By:

Date:

Any BALLOW 12-21-98

ANALYTE	HOLDING TIME	PRESERVATIVE	
		AQUEOUS	SOIL
Metals	180 days	pH < 2 w/HNC3 4 Dec C	4 Dea. C
Mercury	28 days	pH < 2 w/HNC3 4 Dec C	4 Deg. C
Cyanide	: 14 days	pH > 12 w/NaOH, 4 Dat C	4 Deg. C

#### IIA METAL ANALYSIS WORKSHEET -- IOP CALIBRATIONS

Eart Hist all ICP analytes that did not meet the percent recovery criteria for initial calibration verification (ICV) and continuing calibration verification (ICCV).

ANALYTE	ICV CCV	TRUE	FOUND	% R	ACTION	SAMPLES AFFECTED
ΑŞ	J(V	1.0	1.031	107	T - T	
c &	7	Ī	1.085	106	-	
Ph			1.064	106		
· · · · · ·			1.55			( Usez Rum Dota
ΑS	CV 1343	5.0	43.14	دررا		
C		1	5.031	431	-	
هام		-	4115	(5)	-	
						None out
AS	æv1433	5,2	11.84	9 Y	_	7700
( )		1	41.553	103		
62		<del></del>	4.84	19	-	<del></del>
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Vas a CRDI	check sen	nole (CRI) a	nalyzed at the	beginning	and at the end	of each sample run? Yes No (MA) Nun (L
OMMENT			له در لا	اليم	er dus	774
	/ Vic		ا کی گر			2013
			20.74	4. 50		,
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ICV/CCV Actions:

	PERCENT RECOVERY						
	<75%	75-89%	90-110%	111-125%	>125%		
Detected results	R	J	V	J	E		
Non-detected Reside	•	111	W	V	•		

^{1.} If the instrument was not calibrated daily and each time the instrument was set up qualify the data as rejected (R).

# III METAL ANALYSIS WORKSHEET -- BLANKS

	MATRIX:	5-1-5	1 F. 1.	k-	ватсн:	302244
Ist the highes	t positive AND	negative bla	nk result >=	IDL below.	Use one wo	rksheet for soil matrix and another for water matrix.
ANALYTE	ICB CCB PB/MB	IDL.	BLANK CONC.	5 * Bl. Conc.		SAMPLES AFFECTED
	ICO		u			
	CC B 134	4	U		RO	he)
	PB		u		71-10	
	. ccs 1434		4	.04.0		
						No vist- exemps
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NOTE: Ver	ify that the abs	olule value c	any analy	te concentration	nin the PB o	€ M3 is < CRDL
COMMENT				ارد /		
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tetions:		<del></del>				

- 1. if [Blank] < IDL, no action is taken.
- 2. If Blank >= IDL, then all sample results >= IDL and < 5*Blank are non-detected (U).
- If Blank = < -IDL, all sample results >= IDL and < 5* [Blank] are estimated (J).</li>
   If Blank = < -IDL and raw data sample result is = < IDL then non-detected results are estimated (UJ).</li>

### IVA METAL ANALYSIS WORKSHEET -- ICP INTERFERENCE CHECK SAMPLE

BATCH: 3022 W	
---------------	--

NOTE: The sample results can be accepted without qualification, if the sample concentrations of AI, Ca, Fe, and Mg are less than or equal to the concentration found in the ICSA solution.

Examine the sample results in ug/l and list any Al, Ca, Fe, or Mg results that are greater than the ICSA values.

SAMPLE ICS VALUE COMMENTS

Comments

Comments

List any analytes	s in the ICS AB sol	ution that did not r	neet the criteria of 80 – 120% R.
ANALYTE	% R	ACTION	SAMPLES AFFECTED
As	113 109		
<u> </u>	63 88		ce 80-120'
Ph	59 85	//00 -	
	<del></del>		
ļ	<u>.   </u>		
			ning and end of each sample analysis run, or a minimum
of twice per	r 8 - hour shift (whi	chever is more free	quent)? (Yes) No
COMMENTS			
Actions:			

PERCENT RECOVERY

<50% 50-79% 80-12% >120%

Detected results R J V J

Non-detected results R UJ V V

used how for ECBB true 1.0

# IVB METAL ANALYSIS WORKSHEET -- ICP INTERFERENCE CHECK SAMPLE

ont the conc	entration of ar	ıv analytes de	atected in the ICS	3A solution > [IDL	BATCH: that should not be	e present	· .
1	ICSA	1	SAMPLE/	SAMPLE/	SAMPLE/	SAMPLE/	SAMPLE
ANALYTE	RESULT	ACTION	RESULT	RESULT	RESULT	RESULT	RESULT
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				i	l		

#### Actions:

If the ICSA value > the positive IDL:

- 1. For non-detected results, no action is taken.
- 2. Estimate (J) all detected results <= 5*ICSA.

If the ICSA value < -IDL:

- 1. Estimate (J) detected results <= 5* | ICSA|.
- 2. Estimate (W) non-detected results.

# V METAL ANALYSIS WORKSHEET -- PRE-DIGESTION MATRIX SPIKE

!	MATRIX:	もこしょ	-15	_		BATCH:	70534	بر	
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lst all param	eters that do	not meet the	percent reco	overy criteria.	Note: The	pre-digesto	on spike recover	y criteria	
ere not ev	result exceed	i, Mg, K, Na,	AL MIGHER	or soli sample	S, EKU CA, I	My, N, and N ion is taken	la for water sam	pies.	
THE SAMPLE	TOSUIL OXCOOL	SPIKED	I	1	1010,110 001	1	<del>                                     </del>		
SAMPLE		SAMPLE	SAMPLE	SPIKE		1	]		
ID	ANALYTE	RESULT	RESULT	ADDED	% R	ACTION	SAMPLES	VFFECTED	
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		3		C67	181	1 500	Jack L.	<del></del>	
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					frequency o	fonce every	20 samples, or	every SDG	<del></del>
	ver is more fre		Yes		ments excer	ot Silver, that	did not meet the	o pro digostio	a matrix enika
	y criteria?	Yes	No	J. all IO. ele.	HEIRS, EXCE	J. Silver, tries	t did tot meet in	e pre-digestio	II IIIau X Spike
COMMENT				·					
		-e.r.S	(O)	uslmsb		105	Losgion	ccs /c	, C 5 D
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L					<del></del>				
1. If any an	alyte does no	t meet the %	R criteria, q	ualify all asso	ciated sam;	pies using th	ne following crites	ia:	
			Percent Re			•			
		<30%	30-74%	75-125%	_				
Detected re	esults cted results	J R	N) J	V V	J V				
ואטוו-טצופו	いにひ ( こうひょう	C	UJ	V	٧				

#### VI METAL ANALYSIS WORKSHEET -- LABORATORY DUPLICATES

	MATRIX:	£.1/k		_			BATCH: ROZZYY
ist all param	eters that do	not meet % diff	erence or CRI	L criteria.			
SAMPLE	441413077	SAMPLE VALUE	DUP. VALUE	RPD	DIFFERENCE	ACTION	CAMPIEC ASSESSED
ID	ANALYTE	VALUE	VALUE	RPU	DIFFERENCE	ACTION	SAMPLES AFFECTED
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		DUP	el lorne	5-60	605/	CCS1)	
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COMMENT	s						
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Actions:	<del></del>						

#### 1 AOUEOUS

If sample value > 5*CRDL, estimate (J) all sample results of the same matrix if the RPD is > 20%.

If sample value < 5*CRDL, and the difference between the duplicate and the original is > CRDL, estimate (J)/(W) all sample results of the same matrix.

#### 2. SOLID

If sample value > 5*CRDL, estimate (J) all sample results of the same matrix if the RPD is > 35%.

If sample value < 5*CRDL, and the difference between the duplicate and the original is > 2*CRDL, estimate (J)/(W) all sample result of the same matrix.

*Difference = |Sample result - Duplicate sample result|

# VII METAL ANALYSIS WORKSHEET -- LABORATORY CONTROL SAMPLES

List all parame	MATRIX:	F-/7		- criteria.		ватсн <u>: 332244</u>
LCS ID	ANALYTE	TRUE VALUE	FOUND VALUE	% R	ACTION	SAMPLES AFFECTED
	LCJ 4	15	15 /15	-+5		
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COMMENTS						
	Also re	<u>~ · ~</u>	rezn	R12 42	J.1.	
	/_			· · · · · · · · · · · · · · · · · · ·		
Actions:	/ otimosy ood si	il rac barra ca a	ontrollimito d	ta sausaus I C	C in not require	ed for CN and mercury.
exception a	inditionly and si	WELLIAVE INC	Othrormans. F	PERCENT RE	CCVERY	so for CN 2:a mercury.
1. AQUEQU			<50%	50-79%	E0-120%	>120%
Detected (	esuits cled results		R R	N1 1	V	^ 7
				,	•	•
2. SOLID LO	<b>S</b>		<b>5 -</b>			
			BELOW CONTROLL	9,070	WITH'N CONTROLL	ABOVE MITS CONTROLLIMITS
De:ected	esults		CONTROLL	٠٠١٠	V	MITS CONTROLLIMITS J
Non-dete	cted results		UJ		V	v

### VIIIA METAL ANALYSIS WORKSHEET -- ANALYTICAL SPIKE ANALYSIS

1.1-4 -11				4 4 01	. 445.4		BATCH:	
	oles whose anal	SAMPLE	SPIKED SAMPLE	TRUE SPIKE				
ANALYTE	ID	RESULT	RESULT	VALUE	%R	ACTION	COMMENT	
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1. Spike Rec	⇒very: One poi	int analytical s	oikes were ne	rformed for a	all GFAA e	amples? Ye	≈ No	<del></del>
COMMENTS	/	,	, pe					
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-						<del></del>		
<b></b>							<del></del>	
If the comple	condition 5000	altha c="time"						
ii the sample	result is <50%	of the spike re	esuit, or the se	impie result i	ıs >50% c'	the spike resu	TT .	

and the percent recovery is <40% or between 85-115%, the following apply:

	PERCENT RECOVERY							
Actions:	<10%	10-84%	85-115%	>115				
Detected results	J	J	V	J				
Non-detected results	R	UJ	V	V				
*Spike result = I spiked sen	nnia rosult 🗕 si	mnia raguitt						

BATCH:

# VIIIB METAL ANALYSIS WORKSHEET -- FURNACE AA ANALYSIS

	SAMPLE	1st CORR	2nd, CORR	j	, or MSA results were outside control limits.
NALYTE	<u>ID</u>	COEFF.	COEFF.	ACTION	COMMENT
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tions			<u></u>		

List all samples > CRDL whose duplicate injections did not agree within 20% RSD or CV, or samples in which duplicate

injections we	ere not performed	i				·	
	SAMPLE	SAMPLE	DUPLICATE / %R				
ANALYTE	10	RESULT	RESULT or	CV CRDL	ACTION	COMMENT	
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*Spike result = [spiked sample result - sample result]

#### Actions:

was not reported.

- 1. Estimate (J) detected results greater than the CRDL if duplicate injections are outside 20% RSD.
  2. Estimate (J) all sample results if duplicate injections were not performed.

# IX METAL ANALYSIS WORKSHEET -- ICP SERIAL DILUTION ANALYSIS

	MATRIX	- F: 6	۷>	7	4 504501		BATCH: 3022 WY
•			SAMPLE	SERIAL DILUTION RESULT	% D	ACTION	SAMPLES AFFECTED
ANALYTE	IDL	50*IDL	RESULT	RESULI	70 1	ACTOR	SAMPLESAFECTED
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	70 1	4-12					
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INDUCTIVEL	Y COUPLE	D PLASMA S	ERAL DILUTIO	ON ANALYSIS:			
Serial dilutio original und	ns were pe	rformed for e	ach matrix and	results of the d	liuted sam	ple Enalysis ag	greed within ten percent of the
Serial dilutio	ns were no	t performed f	or the following				
COMMENTS		<del></del>			<u>( ic</u>	mi hiti	SD mt required.
						, , , , , ,	
<del></del>							
<del></del>				•			

Actions

Estimate (J) detected results if %D is > 10%.

:

# X METAL ANALYSIS WORKSHEET -- SAMPLE RESULT VERIFICATION

1

BATCH: 3 3 2 244

Describe any raw data anomalies (i.e. baseline shifts, negative ab	sorbances, transcription or calculation errors, legibility, etc.)
N8"	
• /	
List results that fall outside the linear range of the ICP instrument	or the calibrated range of the AA or Cyanide Instrument,
and were not reanalyzed.	
Were ICP linear ranges obtained within 3 months of, and precedi	ing, the sample analyses? - Yes (No NA Not Pro-
	とった いった かんこ
Were ICP Interelement corrections obtained within 12 months of,	and preceding, the sample analyses? Yes NO NA
. Were Instrument detection limits present, found to be less than o	ir equal to the CBDL and obtained within 3 monte of and occase
the sample analyses? Yes RO NA O~ (7 A	rowised RLuglies in us 15.14-
# 105 or cy 31	001 11 12 0711 13 11 14 17 11
. Were all sample results reported down to the IDL? Yes No	·
THE CHI COMPLET COUNTY OF THE COUNTY OF THE COUNTY OF THE COUNTY OF THE COUNTY OF THE COUNTY OF THE COUNTY OF THE COUNTY OF THE COUNTY OF THE COUNTY OF THE COUNTY OF THE COUNTY OF THE COUNTY OF THE COUNTY OF THE COUNTY OF THE COUNTY OF THE COUNTY OF THE COUNTY OF THE COUNTY OF THE COUNTY OF THE COUNTY OF THE COUNTY OF THE COUNTY OF THE COUNTY OF THE COUNTY OF THE COUNTY OF THE COUNTY OF THE COUNTY OF THE COUNTY OF THE COUNTY OF THE COUNTY OF THE COUNTY OF THE COUNTY OF THE COUNTY OF THE COUNTY OF THE COUNTY OF THE COUNTY OF THE COUNTY OF THE COUNTY OF THE COUNTY OF THE COUNTY OF THE COUNTY OF THE COUNTY OF THE COUNTY OF THE COUNTY OF THE COUNTY OF THE COUNTY OF THE COUNTY OF THE COUNTY OF THE COUNTY OF THE COUNTY OF THE COUNTY OF THE COUNTY OF THE COUNTY OF THE COUNTY OF THE COUNTY OF THE COUNTY OF THE COUNTY OF THE COUNTY OF THE COUNTY OF THE COUNTY OF THE COUNTY OF THE COUNTY OF THE COUNTY OF THE COUNTY OF THE COUNTY OF THE COUNTY OF THE COUNTY OF THE COUNTY OF THE COUNTY OF THE COUNTY OF THE COUNTY OF THE COUNTY OF THE COUNTY OF THE COUNTY OF THE COUNTY OF THE COUNTY OF THE COUNTY OF THE COUNTY OF THE COUNTY OF THE COUNTY OF THE COUNTY OF THE COUNTY OF THE COUNTY OF THE COUNTY OF THE COUNTY OF THE COUNTY OF THE COUNTY OF THE COUNTY OF THE COUNTY OF THE COUNTY OF THE COUNTY OF THE COUNTY OF THE COUNTY OF THE COUNTY OF THE COUNTY OF THE COUNTY OF THE COUNTY OF THE COUNTY OF THE COUNTY OF THE COUNTY OF THE COUNTY OF THE COUNTY OF THE COUNTY OF THE COUNTY OF THE COUNTY OF THE COUNTY OF THE COUNTY OF THE COUNTY OF THE COUNTY OF THE COUNTY OF THE COUNTY OF THE COUNTY OF THE COUNTY OF THE COUNTY OF THE COUNTY OF THE COUNTY OF THE COUNTY OF THE COUNTY OF THE COUNTY OF THE COUNTY OF THE COUNTY OF THE COUNTY OF THE COUNTY OF THE COUNTY OF THE COUNTY OF THE COUNTY OF THE COUNTY OF THE COUNTY OF THE COUNTY OF THE COUNTY OF THE COUNTY OF THE COUNTY OF THE COUNTY OF THE COUNTY OF THE COUNTY OF THE COUNTY OF THE COUNTY OF THE COUNTY OF THE COUNTY OF THE COUNTY OF THE COUNTY OF THE COUNTY OF THE COUNTY OF THE COUNTY OF THE	
. Were sample weights, volumes, percent solids, and dilutions use	ed correctly when reporting the results? Yes No
	24:4 ON
OMMENTS	
1 (: 140 m)	
landola in mall	
of mall x sometime	As = 0.1 mg/L
usini x was	C 2 · 0.005 /
•	Ph: 0-05 V
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# REGION VIII SUMMARY OF DATA QUALITY ASSURANCE REVIEW INORGANIC

TDD No.	Site N	ame	Operable Unit
75-80914	Vasquez & I-70		
RPM/OSC Name	·		
Pete Stevenson			
Contractor Laboratory	Contract No.	Report No.	Laboratory DPO/Region
Quanterra, Inc.	OS-98-P-5436	302114	

Review Assigned Date	December 2, 1998	Data Validator	Bill Fear
Review Completion Date	December 21, 1998	Report Reviewer	Amy Ballow

Sample ID	Laboratory ID	Matrix	Analysis
200047N-10-15	302114-0001	Filter	Metals (Arsenic, Cadmium, and Lead) by SW-846 Method 6010B
200047E-10-15	302114-0002		
2000478-10-15	302114-0003		
4711THN-10-15	302114-0004	·	
4711THE-10-15	302114-0005		
4711THS-10-15	302114-0006		·
200047N-10-16	302114-0007		·
200047E-10-16	302114-0008		
2000478-10-16	302114-0009		
4711THN-10-16	302114-0010		•
4711THE-10-16	302114-0011		
4711THS-10-16	302114-0012		

# DATA QUALITY STATEMENT

(X) () ()	Data are ACCEPTABLE according to by the reviewer.  Data are UNACCEPTABLE according Data are acceptable with QUALIFICA	g to EPA Functional Gu	idelines.
Teleph	one/Communication Logs Enclosed?	Yes	NoX
TPO A	ttention Required? Yes	NoX If yes	s, list the items that require attention:

#### INORGANIC DATA QUALITY ASSURANCE REVIEW

#### **REVIEW NARRATIVE SUMMARY**

This data package was reviewed according to "USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review," February 1994, modified for the method used. Qualification taken on sample results based on the Functional Guidelines that differ from method requirement are identified within the report.

The data package TDD No.75-80914, Report No. 302114, consisted of 12 filter samples for arsenic, cadmium, and lead analyses by SW-846 Method 6010B.

The following table lists the data qualifiers added to the sample analyses. Please see Data Qualifier Definitions, attached to the end of this report.

Sample ID	Elements	Qualifiers	Reason for Qualification	Review Section
None	None	None	None	None

302114m Inorganic - 3

Data Validation Report

	od/SOW Number SW-846. Method 6010 on 0.0				
	Inorganic Deliverables Completeness Che	ecklist	:	•	-
P	Continuing Calibration Verification Results CRDL Standard for ICP and AA Blank Analysis Results ICP Interference Check Sample Results Spiked Sample Results Post-digest spiked Sample Analysis Duplicate Sample Results Instrument Detection Limits Laboratory Control Sample results Standard Addition Results ICP Serial Dilution Results Holding Times Summary Sheet ICP Interelement Correction Factors ICP Linear Ranges				
P P P P	P Samples P Calibration Standards P Duplicates P ICP QC (ICS and Serial Dilution NA Furnace AA NA Mercury Analysis Percent Solids Calculations - Solids Only		Blanks LCS Cyanide An		Spikes
KEY: P R NP NR NA	<ul> <li>Provided in original data package, as required by the SOW</li> <li>Provided as Resubmission</li> <li>Not provided in original data package or as resubmission</li> <li>Not required under the SOW</li> <li>Not applicable to this data package or analysis</li> </ul>				

# I.

Comments:

None.

I.	DELIVERABLES				
	All deliverables were present.				
	Yes	No_X_			
	Comments:	Appropriate data were provided for method 6010 analyses. However, matrix spike analyses could not performed on these filter samples.			
II.	HOLDING T	IMES AND PRESERVATION CRITERIA			
	All holding tir	mes and preservations criteria were met.			
	Yes_X_	No			
	Comments:	The samples were analyzed within holding times. No shipping or receiving problems were noted.			
III.	III. INSTRUMENT CALIBRATIONS: STANDARDS AND BLANKS				
	Initial instrument calibrations were performed according to requirements.				
	Yes_X_	No			
	Comments:	None.			
	The instrumen	ts were calibrated daily and each time an analysis run was performed.			
	Yes_X_	No			
	Comments:	None.			
	The instrumen	ts were calibrated using one blank and the appropriate number of standards.			
	Yes_X_	No			

URS Operating Services, Inc.

IV.	FORM 1 - SA	MPLE ANALYSIS RESULTS	
	Sample analyses were entered correctly on Form Is.		
	Yes_X_	No	
	Comments:	None.	
v.	FORM 2A - II	NITIAL AND CONTINUING CALIBRATION VERIFICATION	
	The initial and requirements.	continuing calibration verification standards (ICV and CCV, respectively) met	
	Yes_X_	No	
	Comments:	None.	
		n verification results were within 90-110% recovery for metals, 85-115% for 0-120% for mercury.	
	Yes_X_	No	
	Comments:	None.	
	The continuing	calibration standards were run at 10% frequency.	
	Yes_X_	No	
	Comments:	None.	
71.	FORM 2B - CI	RDL STANDARD FOR ICP AND AA	
	analyzed at the	Standards (CRI) at two times the CRDL or the IDL (whichever were greater) were beginning and the end of each sample run, or at a minimum of twice per eight	

hours, whichever was more frequent.

No___ NA_X_

A CRDL standard was not required for method 6010. Comments:

	GFAA Analy sample run.	sis: Standards (CRA) at two times CRDL were analyzed at the beginning of each
	Yes	No NA_X_
	Comments:	None.
	The CRI and/	or the CRA were analyzed after the ICV.
	Yes	No NAX
	Comments:	A CRI was analyzed but the data were not summarized as this analysis was not required for this method.
VII.	FORM 3 - BI	LANKS
	The initial and	continuing calibration blanks (ICB and CCB, respectively) met requirements.
	Yes_X_	No
	Comments:	None.
	The continuing	g calibration blanks were run at 10% frequency.
	Yes_X_	No
	Comments:	Continuing calibration blanks were run every 10 samples.
		reparation blank was run at the frequency of one per twenty samples, or per sample (whichever is more frequent), and for each matrix analyzed.
	Yes_X_	No
	Comments:	None.
	All analyzed b	lanks were free of contamination.
	Yes_X_	No
	Comments:	None.

#### VIII. FORM 4 - ICP INTERFERENCE CHECK SAMPLE

The ICP interference check sample (ICS) was run twice per eight hour shift and/or at the beginning and end of each sample set analysis sequence (whichever is more frequent).

Yes_X_ No___

Comments: None.

Percent recovery of the analytes in solution ICSAB were within the range of 80-120%.

Yes_X_ No___

Comments: Arsenic, cadmium, and lead recoveries from the ICSAB solution were within QC

criteria. No action was required for the ICSA analysis.

#### IX. FORM 5A - MATRIX SPIKE SAMPLE ANALYSIS

A matrix spike sample was analyzed with every twenty or fewer samples of a similar matrix, or one per sample delivery group (whichever is more frequent).

Yes___ No_X_

Comments: Matrix spike analyses were not performed. Apparently because these samples are

filters and only one filter for each sample was provided, the laboratory could not perform matrix spike analyses. The laboratory analyzed two laboratory control

samples to evaluate the data for accuracy.

The percent recoveries (%R) were calculated correctly.

% Recovery = 
$$\frac{(SSR - SR)}{SA}$$
 X 100

SSR = spiked sample result

SR = sample result

SA = spike added

Yes___ No___ NA_X

Comments: None.

Spike recoveries were within the range of 75-125% (an exception is granted where the sample concentration is four times the spike concentration).

Yes___ No___ NA_X_

Comments:

Matrix spike analyses could not be performed due to insufficient sample amounts.

#### X. FORM 5B - POST DIGEST SPIKE RECOVERY

A post-digest spike was performed for those elements that did not meet the specified criteria (i.e., Pre-digestion/pre-distillation spike recovery falls outside of control limits and sample result is less than four times the spike amount added, exception: Ag, Hg).

Yes____

No____

NA_X

Comments:

Post digestion spikes were not performed.

#### XI. FORM 6 - DUPLICATE SAMPLE ANALYSIS

Duplicate sample analysis was performed with every twenty or fewer samples of a similar matrix, or one per sample delivery group (whichever is more frequent).

Yes____

No_X

Comments:

Duplicate data were performed using a laboratory control sample duplicate due to insufficient sample size. (One filter per sample.)

The RPDs were calculated correctly.

 $RPD = \frac{(S-D)}{(S+D)/2} \times 100$ 

S = sample

D = duplicate

Yes_X_

No____

Comments:

None.

For sample concentrations greater than five times the CRDL, RPDs were within  $\pm 20\%$  (limits of  $\pm 35\%$  apply for soil/sediments/tailings samples).

Yes X

No___

Comments:

None.

For sample concentrations less than five times the CRDL, duplicate analysis results were within the control window of  $\pm$  CRDL (two times CRDL for soils).

Yes_X_

No___

Comments:

None.

XII.	GFAA QC		
	Duplicate injections were performed on all GFAA samples and the RSD was within $\pm~20\%$ .		
	Yes	No	NAX
	Comments:	None.	
	Analytical spil	kes were perform	ned on all GFAA samples and the percent recovery was 85 - 115%.
	Yes	No	NA_X_
	Comments:	None.	
	MSAs were an	nalyzed when red	quired and the correlation coefficient was > 0.995.
	Yes	No	NA_X_
	Comments:	None.	
XIII.	FORM 7 - LA	ABORATORY (	CONTROL SAMPLE
	The laboratory control sample (LCS) was prepared and analyzed with every twenty or few samples of a similar matrix, or one per sample delivery group (whichever is more frequent).		
	Yes_X_	No	
	Comments:	None.	
	All results wer	e within control	limits.
	Yes_X_	No	
	Comments:	None.	
XIV.	FORM 8 - ST	ANDARD ADD	DITION RESULTS
	Results from g	raphite furnace s	standard additions were entered on Form VIII.
	Yes	No	NA_X

Comments:

None.

#### XV. FORM 9 - ICP QC

A serial dilution was performed for ICP analysis with every twenty or fewer samples of a similar matrix, or one per sample delivery group, whichever is more frequent.

Yes_X_ No___

Comments: A serial dilution was performed, however, the serial dilution data were not

reported or required as cadmium, lead, and arsenic were reported as non-detected

in the original sample analyses.

The serial dilution was without interference problems.

Yes_X_ No___

Comments: None.

#### XVI. FORM 10 - QUARTERLY INSTRUMENT DETECTION LIMITS (IDL)

IDLs were provided for all elements on the target analyte list.

Yes___ No_X_

Comments: Only the reporting limits were provided. IDLs and CRDLs were not provided for

these 6010 analyses.

Reported IDLs met requirements.

Yes_X_ No___

Comments: Required IDLs were not provided for validation.

#### XVII. FORM 11 - INTERELEMENT CORRECTION FACTORS FOR ICP

Interelement corrections for ICP were reported.

Yes___ No_X_

Comments: The interelement corrections were not provided. Interference was evaluated using

the interference check samples.

URS Operating Services, Inc.

Comments:

XVIII.	VIII. FORM 12 - ICP LINEAR RANGES			
	ICP linear ranges were reported.			
	Yes	No	NA_X_	
	Comments:		nt linear ranges were not provided or required as all samples results he reporting limits.	
XIX.	XIX. LINEAR RANGE VERIFICATION ANALYSIS			
	Linear Range Verification Analysis (LRA) was performed and results were within control limits of $\pm$ 5% of the true value.			
	Yes	No	NA_X_	
	Comments:	None.		
XX.	XX. FORM 13 - PREPARATION LOG			
	Information on the preparation of samples for analysis was reported on Form XIII.			
	Yes_X_ No			
	Comments:	A digestion log	og was provided.	
XXI.	FORM 14 - A	ANALYSIS RUN	N LOG	
	A Form XIV v	with the required	information was filled out for each analysis run in the data package.	
	Yes_X_	No		
	Comments:	Instrument run	n logs were provided.	
XXII.	Additional Co	omments or Pro	oblems/Resolutions Not Addressed Above	
	Yes_X_	No		

302114m Inorganic - 12

theses filter metal analyses.

Only the results for arsenic, cadmium, and lead were reported on the Form 1s for

#### INORGANIC DATA QUALITY ASSURANCE REVIEW

#### Region VIII

#### DATA QUALIFIER DEFINITIONS

For the purpose of Data Validation, the following code letters and associated definitions are provided for use by the data validator to summarize the data quality. Use of additional qualifiers should be carefully considered. Definitions for all qualifiers used should be provided with each report.

### GENERAL QUALIFIERS for use with both INORGANIC and ORGANIC DATA

- R Reported value is "rejected." Resampling or reanalysis may be necessary to verify the presence or absence of the compound.
- J The associated numerical value is an estimated quantity because the Quality Control criteria were not met.
- U J The reported amount is estimated because Quality Control criteria were not met. Element or compound was not detected.
- N J The analysis indicates the presence of an analyte that has been "tentatively identified" and the associated numerical value represents its approximate concentration.
- The analysis indicates the presence of an analyte for which there is presumptive evidence to make a tentative identification.
- The material was analyzed for, but was not detected above the level of the associated value.
   The associated value is either the sample quantitation limit or the sample detection limit.

302114m Inorganic - 13

#### **ACRONYMS**

AA Atomic Absorption

Ag Silver

CCB Continuing Calibration Blank

CCV Continuing Calibration Verification

CFR Code of Federal Regulations
CLP Contract Laboratory Program
CRA CRDL standard required for AA
CRDL Contract Required Detection Limit
CRI CRDL standard required for ICP

CV Cold Vapor

EPA U.S. Environmental Protection Agency
GFAA Graphite Furnace Atomic Absorption

Hg Mercury

ICB Initial Calibration Blank
ICP Inductively Coupled Plasma
ICS Interference Check Sample

ICSA Interference Check Sample (Solution A)
ICSAB Interference Check Sample (Solution AB)

ICV Initial Calibration Verification
IDL Instrument Detection Limit
LCS Laboratory Control Sample

LRA Linear Range Verification Analysis

MSA Method of Standard Additions

PDS Post Digestion Spike QC Quality Control

RPD Relative Percent Difference RPM Regional Project Manager

RSD Percent Relative Standard Deviation

SA Spike Added

SAS Special Analytical Services
SDG Sample Delivery Group

SOW Statement of Work

SR Sample Result

SSR Spiked Sample Result
TPO Technical Project Officer



Client Name: URS Operating Services, Inc. Client ID: 200047N-10-15
Lab ID: 302114-0001-SA

Client ID: Lab ID: Matrix:

Authorized: 19 OCT 98

FILTER

Sampled: 15 OCT 98 Prepared: See Below

Received: 19 OCT 98 Analyzed: See Below

Parameter	Result	Units	Reporting Limit	Analytical Method	Prepared Date	Analyzed Date
Arsenic Cadmium Lead	ND ND ND	total ug total ug total ug	0.20	6010B 6010B 6010B	19 OCT 98	19 OCT 98 19 OCT 98 19 OCT 98

R- 12/19/91

ND = Not detected NA = Not applicable

Reported By: Wennilyn Fua

Approved By: John Barnett

The cover letter is an integral part of this report. Rev 230787



Client Name: URS Operating Services, Inc. Client ID: 200047E-10-15
Lab ID: 302114-0002-SA

Matrix: FILTER Sampled: 15 OCT 98 Received: 19 OCT 98 Prepared: See Below Authorized: 19 OCT 98 Analyzed: See Below

Parameter	Result	Units	Reporting Limit	Analytical Method	Prepared Date	Analyzed Date
Arsenic	ND	total ug	4.0	6010B	19 OCT 98	19 OCT 98
Cadmium	ND	total ug	0.20	6010B		19 OCT 98
Lead	ND	total ug	2.0	6010B		19 OCT 98

05.3/16/1x

ND = Not detected NA = Not applicable

Reported By: Wennilyn Fua

Approved By: John Barnett

The cover letter is an integral part of this report.

Rev 230787 . .



Client Name: URS Operating Services, Inc. Client ID: 200047S-10-15

Lab ID: 302114-0003-SA
Matrix: FILTER
Authorized: 19 OCT 98 Sampled: 15 OCT 98 Prepared: See Below Received: 19 OCT 98 Analyzed: See Below

Parameter	Result	Units	Reporting Limit	Analytical Method	Prepared Date	Analyzed Date
Arsenic Cadmium Lead	ND ND ND	total ug total ug total ug	0.20	6010B 6010B 6010B	19 OCT 98	19 OCT 98 19 OCT 98 19 OCT 98

ND = Not detected NA = Not applicable

Reported By: Wennilyn Fua

Approved By: John Barnett

The cover letter is an integral part of this report. Rev 230787

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Client Name: URS Operating Services, Inc. Client ID: 4711THN-10-15
Lab ID: 302114-0004-SA

Matrix: FILTER Sampled: 15 OCT 98 Received: 19 OCT 98 19 OCT 98 Authorized: Prepared: See Below Analyzed: See Below

Parameter	Result	Units	Reporting Limit	Analytical Method	Prepared Date	Analyzed Date
Arsenic Cadmium Lead	ND ND ND	total ug total ug total ug	0,20	6010B 6010B 6010B	19 OCT 98	19 OCT 98 19 OCT 98 19 OCT 98

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ND = Not detected NA = Not applicable

Reported By: Wennilyn Fua Approved By: John Barnett

The cover letter is an integral part of this report.

Rev 230787

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Client Name: URS Operating Services, Inc. Client ID: 4711THE-10-15

Lab ID: 302114-0005-SA

Sampled: 15 OCT 98 Prepared: See Below Matrix: FILTER Received: 19 OCT 98 Authorized: 19 OCT 98 Analyzed: See Below

Parameter	Result	Units	Reporting Limit	Analytical Method	Prepared Date	Analyzed Date
Arsenic Cadmium Lead	ND ND ND	total ug total ug total ug	0.20	6010B 6010B 6010B	19 OCT 98	19 OCT 98 19 OCT 98 19 OCT 98

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ND = Not detected NA = Not applicable

Reported By: Wennilyn Fua

Approved By: John Barnett

The cover letter is an integral part of this report. Rev 230787



Client Name: URS Operating Services, Inc. Client ID: 4711THS-10-15
Lab ID: 302114-0006-SA
Matrix: FILTER Sampled: Authorized: 19 OCT 98 Prepared: Sampled: 15 OCT 98 Prepared: See Below Received: 19 OCT 98 Analyzed: See Below

Parameter	Result	Units	Reporting Limit	Analytical Method	Prepared Date	Analyzed Date
Arsenic Cadmium Lead	ND ND ND	total ug total ug total ug	0.20	6010B 6010B 6010B	19 OCT 98	19 OCT 98 19 OCT 98 19 OCT 98

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ND = Not detected NA = Not applicable

Approved By: John Barnett Reported By: Wennilyn Fua

The cover letter is an integral part of this report. Rev 230787



Client Name: URS Operating Services, Inc. Client ID: 200047N-10-16
Lab ID: 302114-0007-SA

Matrix: FILTER Sampled: 16 OCT 98 Received: 19 OCT 98 Authorized: 19 OCT 98 Prepared: See Below Analyzed: See Below

Parameter	Result	Units	Reporting Limit	Analytical Method	Prepared Date	Analyzed Date
Arsenic Cadmium Lead	ND ND ND	total ug total ug total ug	0.20	6010B 6010B 6010B	19 OCT 98	19 OCT 98 19 OCT 98 19 OCT 98

ND = Not detected NA = Not applicable

Reported By: Wennilyn Fua

Approved By: John Barnett

The cover letter is an integral part of this report.

Rev 230787

(* 12/10/10x



Client Name: URS Operating Services, Inc. Client ID: 200047E-10-16

Lab ID: 302114-0008-SA

Matrix: FILTER Sampled: 16 OCT 98 Received: 19 OCT 98 19 OCT 98 Authorized: Prepared: See Below Analyzed: See Below

Parameter	Result	Units	Reporting Limit	Analytical Method	Prepared Date	Analyzed Date
Arsenic Cadmium Lead	ND ND ND	total ug total ug total ug	0.20	6010B 6010B 6010B	19 OCT 98	19 OCT 98 19 OCT 98 19 OCT 98

ND = Not detected NA = Not applicable

Reported By: Wennilyn Fua

Approved By: John Barnett

The cover letter is an integral part of this report. Rev 230787



Client Name: URS Operating Services, Inc. Client ID: 2000475-10-16

Lab ID: 302114-0009-SA

Matrix: Sampled: 16 OCT 98 Prepared: See Below FILTER Received: 19 OCT 98 19 OCT 98 Authorized: Analyzed: See Below

Parameter	Result	Units	Reporting Limit	Analytical Method	Prepared Date	Analyzed Date
Arsenic Cadmium Lead	ND ND ND	total ug total ug total ug	0.20	6010B 6010B 6010B	19 OCT 98	19 OCT 98 19 OCT 98 19 OCT 98

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ND = Not detected NA = Not applicable

Reported By: Wennilyn Fua

Approved By: John Barnett

The cover letter is an integral part of this report.
Rev 230787



Client Name: URS Operating Services, Inc. Client ID: 4711THN-10-16
Lab ID: 302114-0010-SA

Matrix: FILTER Sampled: 16 OCT 98 Received: 19 OCT 98 Authorized: 19 OCT 98 Prepared: See Below Analyzed: See Below

Parameter	Result	Units	Reporting Limit	Analytical Method	Prepared Date	Analyzed Date
Arsenic Cadmium Lead	ND ND ND	total ug total ug total ug	0.20	6010B 6010B 6010B	19 OCT 98	19 OCT 98 19 OCT 98 19 OCT 98

x 12/19/5

ND = Not detected NA = Not applicable

Reported By: Wennilyn Fua

Approved By: John Barnett

The cover letter is an integral part of this report. Rev 230787



Client Name: URS Operating Services, Inc. Client ID: 4711THE-10-16

Lab ID: 302114-0011-SA Matrix: FILTER Authorized: 19 OCT 98 Sampled: 16 OCT 98 Prepared: See Below Received: 19 OCT 98 Analyzed: See Below

Parameter	Result	Units	Reporting Limit	Analytical Method	Prepared Date	Analyzed Date
Arsenic Cadmium Lead	ND ND ND	total ug total ug total ug	0.20	6010B 6010B 6010B	19 OCT 98	19 OCT 98 19 OCT 98 19 OCT 98

ND = Not detected NA = Not applicable

Reported By: Wennilyn Fua

Approved By: John Barnett

The cover letter is an integral part of this report. Rev 230787



Client Name: URS Operating Services, Inc. Client ID: 4711THS-10-16

Lab ID: 302114-0012-SA

Matrix: FILTER Authorized: 19 OCT 98 Sampled: 16 OCT 98 Received: 19 OCT 98 Prepared: See Below Analyzed: See Below

Parameter	Result	Units	Reporting Limit	Analytical Method	Prepared Date	Analyzed Date
Arsenic Cadmium Lead	ND ND ND	total ug total ug total ug	0.20	6010B 6010B 6010B	19 OCT 98	19 OCT 98 19 OCT 98 19 OCT 98

ND = Not detected NA = Not applicable

Reported By: Wennilyn Fua

Approved By: John Barnett

The cover letter is an integral part of this report.

Rev 230787

#### I METAL ANALYSIS WORKSHEET -- HOLDING TIMES

BATCH:	305117	٠
_		•

List all analytes which do not meet holding time criteria

$\lceil$	SAMPLE	Matrix	PRE- SERVED		DATE	ANAL	TAR	HO CYAA ANALYSIS		CH ANALYSIS		TASIS	PAST	OF DAYS HOLDING	
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,	Actions					<del></del>									<del></del>
	ACUONS														

1. If holding times are exceeded, all sample results are estimated (J)/(UJ).

2. If holding times are grossly exceeded (>= 2*holding time), detected results are estimated (J), and non-detected results are rejected (R).

Validated By:

Date

Reviewed By: Umus DZ

12/21/98at

ANALYTE HOLDING TIME PRESERVATIVE SOIL AQUEOUS Metals 180 days pH < 2 w/HN∞, 4 Deg. C 4 Deg. C Mercury 28 days pH < 2 w/HNC3, 4 Dec. C 4 Deg. C Cyanide 4 Deg C pH > 12 w/NaOH, 4 Deg. 0 14 days

Holding Time = Analysis Date - Collection Date

met1/techlaw/policy7

### IIA METAL ANALYSIS WORKSHEET -- IOP CALIBRATIONS

BATCH:

List all ICP analytes that did not meet the percent recovery criteria for Initial calibration verification (ICV) and continuing calibration verification (ICCV).

NALYTE	25 25	TRUE	FOUND	% R	ACTION	SAMPLES AFFECTED
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as a CRD	check ex	note (CRI)	analyzed at th	e beginning	and at the en	nd of each sample run? Yes No (UL)
OMMENT						Non (cl
<del></del>					······································	
					,	

IOV/COV Actions:

PERCENT RECOVERY <75% 75-89% 90-110% 111-125% >125% Detected results J £. R Non - detented Results IJ ٧

If the instrument was not calibrated daily and each time the instrument was set up, qualify the data as rejected (R).

## III METAL ANALYSIS WORKSHEET -- BLANKS

t the highes	:MATRIX Dositive ANI	t: \ ter	nk result >-	- IIDi I belay	BATCH:	diaha a fa
ANALYTE	ICB CCB PB/MB	1	PERMIT	II.	l .	orksheet for soll matrix and another for water n
	IC?	IDL	CONC.	5 * Bl. Conc.	ACTION	SAMPLES AFFECTED
	ccs		u u	<del> </del>		
	PB		u	<del> </del>		
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		<u> </u>	<u> </u>	<u> </u>		
OIE: Verif	y that the abso	olule value c	any analyte	concentration	in the PB or	M3 is < CRDL
OMMENTS	<del></del>					
	<del></del>					
tions:						

- 1. If [Blank] < IDL, no action is taken.

- If Blank >= IDL, then all sample results >= IDL and < 5*Blank are non-detected (U).</li>
   If Blank =< -IDL, all sample results >= IDL and < 5*[Blank] are estimated (J).</li>
   If Blank =< -IDL and raw data sample result is =< IDL then non-detected results are estimated (UJ).</li>

As. 0.1 C2- 0.05 ps. 0.5

## IVA METAL ANALYSIS WORKSHEET -- ICP INTERFERENCE CHECK SAMPLE

				BATCH:	
TE: The sample	e results can be a	ccepted without	qualification, if the	sample concentrations of Al, Ca, Fe	
Mg are less in	an or equal to the	concentation to	und in the ICSA so	Diution.	
amine the samp	le results in uo/l a	nd list anv Al. Ca	. Fe. or Ma results	that ere greater than the ICSA value	es.
SAMPLE		SAMPLE	ICS		
1D	ANALYTE	RESULT	VALUE	COMMENTS	
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1	<u> </u>				
st anv analytes i	n the ICS AB solu	tion that did not	meet the criteria of	80-120% R.	
ANALYTE	% R	ACTION .		MPLES AFFECTED	
100000					
· (~)	80-1201	F-1	AS C S	1- ab	
	***	F.,	1 2 2	8- (-2	
			 		
					
					
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Mara Interference	o Chook Complet	run at the backs	ning and sad of sa	ch sample analysis run, or a minimu	
					ım
	3-hour shift (whice	never is more fre	quent)? Yes)	No	
COMMENTS					
					·
					
					
Actions:			-		
			PERCENT REG	COVEEY	
		<50		80-121% >120%	
Detected results		R		V J	
Non-detected:	resulis	R	UJ	VV	

IVB METAL ANALYSIS WORKSHEET -- ICP INTERFERENCE CHECK SAMPLE

BATCH: Report the concentration of any analytes detected in the ICSA solution > | IDL| that should not be present ICSA SAMPLE/ SAMPLE/ SAMPLE/ SAMPLE/ SAMPLE ANALYTE **RESULT** ACTION RESULT RESULT RESULT RESULT RESULT ï

Actions:

If the ICSA value > the positive IDL:

- 1. For non-detected results, no action is taken.
- 2. Estimate (J) all detected results <= 5*ICSA.

If the ICSA value < -IDL:

- 1. Estimate (J) detected results <= 5* [ICSA].
- 2. Estimate (W) non-detected results.

V METAL ANALYSIS WORKSHEET -- PRE-DIGESTION MATRIX SPIKE

i	MATRIX:	<u> </u>	R 4	•		BATCH:		
are not ev	eters that do aluated for Ca result exceed	. Ma. K. Na.	Al and Fe fo	r soil sample	s, and Ca, k	Ag, K, and N	n spike recovery criteria a for water samples.	
i ilia sambia	Tesoit exceed	SPIKED	Oded by a le	1	1010 ₁ 110 <u></u> 11	1		
SAMPLE		SAMPLE	SAMPLE	SPIKE				
aı	ANALYTE	RESULT	RESULT	ADDED	% R	ACTION	SAMPLES AFFECTED	
		 		ii				
			4 6		177	0	tos .	
		Re		5-0-	1-0	1-12-	163	
		12		 		<u> </u>		
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			1					
1. Was a r	ore - digestion	matrix spike	prepared at	the required f	requency of	choe every	20 samples, or every SDG	
(whiche	ver is more from	equent)?	Yes	(c/l ⁷				
				or all ICP elem	nents, excep	: Silver, that	did not meet the pre-digestion	matrix spik
	ry criteria?	Yes	No					
COMMEN	TS							
1	/ <i>U</i> i	5 MSI	Atom	dre f	v :^	SUFFLUE	ent somple	
		K-1her	15-	- OL4				
				4				
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L					,			
1. If any a Actions:	nalyte does n	ot meet the %	R criteria, q	ualify a:: esso	ciated sam;	es using th	efollowing criteria:	
			Percent R	ecover.				
	-	<30%	30-7-%	75-125%	>125%		4	
Detected r		J	J	V	J			
Non-dete	ected results	R	UJ	V	V			

VI METAL ANALYSIS WORKSHEET -- LABORATORY DUPLICATES

•	MATRIX:	£' 174-	• 	BATCH:						
t all param	eters that do	not meet % on	lerence or CRI DUP.							
SAMPLE ID	ANALYTE	SAMPLE VALUE	VALUE_	RPD	DIFFERENCE		SAMPLES AFFECTED			
	AS			36		-Adm				
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		to be	9 14	r ti.x	spice					
										
					·					

1. AQUEOUS

If sample value > 5*CRDL, estimate (J) all sample results of the same matrix of the RPD is > 20%.

If sample value < 5°CRDL, and the difference between the duplicate and the original is > CRDL, estimate (J)/(UJ) all sample results of the same matrix.

2. SOLID

If sample value > 5*CRDL, estimate (J) all sample results of the same matrix if the RPD is > 35%.

If sample value < 5*CRDL, and the difference between the duplicate and the original is > 2*CRDL, estimate (J)/(W) all sample result the same matrix.

*Difference = | Sample result - Duplicate sample result|

VII METAL ANALYSIS WORKSHEET -- LABORATORY CONTROL SAMPLES

	MATRIX:	4:11	·~			ватсн:
Ust all param	neters that do no	t meet the pe	rcent recovery	criteria.		D/(101)
LCS ID	ANALYTE	TRUE VALUE	FOUND VALUE	%R	АСПОИ	SAMPLES AFFECTED
	7.7			45		
	2			ارما	A	Lulia lebliate
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Actions:	antimony and si	iver have con	∽atrol limits	An agusquei C	S is not require	ed for CN and mercury.
				PERCENT RE	ECOVERY	
1. AQUEO			<50%	50-79%	80 - 120%	_
	lected results		R R	ل ال	:;	^ 1
0 001101	00			•		
2. SOLID L	.05		BELC∴		% *- :N	ASOVE
-			CONTROLL		೦೦%-೨೩೬	MITS CONTROLLIMITS
Detected	d results elected results		; ! · ·		••	J
14006	statied results		UJ		•	V

VIIIA METAL ANALYSIS WORKSHEET -- ANALYTICAL SPIKE ANALYSIS

List all samp	les whose anal	vical spike rec	overy did no	t meet the &	5-115 % r	covery criteria	BAICH:
	SAMPLE	SAMPLE	SPIKED SAMPLE	TRUE SPIKE			
ANALYTE	1D	RESULT	RESULT	VALUE	%R	ACTION	COMMENT
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	covery: One po	ini analytical s	pikes were p	ectormed tor	E GFAAS	attples? Y	8 No
COMMENTS	<u> </u>						
							
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L							
If the sample	regultic < 50%	of the coike of	cult acthor		:- NEAR' 6	· enite roa	

If the sample result is <50% of the spike result, or the sample result is >50% of the spike result and the percent recovery is <40% or between 85—115%, the following apply:

	PERCENT RECOVERY							
Actions:	<10%	10-84%	85-115%	>1155				
Detected results	J	J	V	J				
Non-detected results	R	UJ	V	V				
*Spike result = [spiked sar	nple result – sa	Emple result[

Actions

BATCH:

VIIIB METAL ANALYSIS WORKSHEET -- FURNACE AA ANALYSIS

If the sample result is >= 50% of the spike result and the percent recovery was between 40-84%

01 > 113%, 1	ien wow most de	penomieu.			
List all samp	les for which an M	ISA analysis w	ras required bu	t not performed	1, or MSA results were outside control limits.
	SAMPLE	1st CORR	2nd. CORR		
ANALYTE	10	COEFF.	COEFF.	ACTION	COMMENT
					•
					•
			<u> </u>		•
		<u></u>			
	•				

was not reported.

List all samples > CRDL whose duplicate injections did not agree within 20% PSD cr CV, or samples in which duplicate

2. If the correlation coefficient was <0.995, the MSA should be performed a second time. Estimate (J) all sample results.

injections we	ere not benomed	0		***	 :		
	SAMPLE		OUPLICATE	%?SD			į į
ANALYTE	10	RESULT/	RESULT	or CV	CRDL	NCITOA	COMMENT
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if a reanalysis was not performed, or the reanalysis exprelation coefficient was < 0.395, or result from the highest correlation coefficient

1. Estimate (J) if an MSA was required and not performed.

Actions

- 1. Estimate (J) detected results greater than the CRDL if duplicate injections are outside 20% RSD.
- 2. Estimate (J) all sample results if duplicate injections were not performed.

^{*}Spike result = |spiked sample result - sample result|

IX METAL ANALYSIS WORKSHEET --- ICP SERIAL DILUTION ANALYSIS

	MATRIX:	4-14			ord EΩ±EΩ1 o		BATCH:
ial dilution	culeus ould s	applies if the	original sampl SAMPLE	e result Is at le SERIAL DILUTION	ast 50-IDL a	10 %0 > 10	ю.
WALYTE .	IDL	50*DL	RESULT	RESULT	%D_	ACTION	SAMPLES AFFECTED
			7	(2/)	5.+		
	MC 72.	es v	re ch	cll si	} _		
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	Fest	142	ac /	00 (75	NA	as 550 k In
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OLICTA (E	IV COLIDI E	DI VOIVA C	EDIAL DILLETO	ON ANALYSIS:	1 .	1 .	
erial dilution original un	ons were per idiluted analy	rsis. Yes	ech matrix and No	results of the	diuted samp	ole analysis a	greed within tan percent of the
eial dilutio	ons were no t	performed to	or the following	g: 			
OMMENT	8						
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Actions

Estimate (J) detected results if %D is > 10%.

.

X METAL ANALYSIS WORKSHEET -- SAMPLE RESULT VERIFICATION

. . .

BATCH:	 •

Describe any raw data anomalies (i.e. baseline shifts, negative absorbances, transcription or calculation errors, legibility, etc.) List results that fall outside the linear range of the ICP instrument or the satisfated range of the IAA or Cyanide instrument, and were not reanalyzed. Were ICP linear ranges obtained within 3 months of, and proceeding, the sample analyses? Yes (No) NA AND Creatives ICP insertement corrections obtained within 12 months of, and proceeding, the sample analyses? Yes No NA AND Creatives ICP insertement detection limits present, found to be less than or equal to the CRDL, and obtained within 3 months of, and proceed the sample analyses? Yes No NA AND CREATIVES NO CREATIV		
List results that fall outside the linear range of the KP instrument or the calibrated range of the AA or Cyanide Instrument, and were not reanalyzed. Were ICP linear ranges obtained within 3 months of, and preceding, the sample analyses? Yes (No) NA (From the ICP interelement corrections obtained within 12 months of, and preceding, the sample analyses? Yes (No) NA Were Instrument detection limits present, found to be less than or equal to the CRDL, and obtained within 3 monts of, and precede the sample analyses? Yes No NA (No) (Recease the sample results reported down to the IDL? Yes No Were sample weights, volumes, percent solids, and dilutions used correctly when reporting the results? Yes No COMMENTS AST C. I why I x 40 m L = U wy (F-1 limits)	. Describe any raw data	anomalies (i.e. baseline shifts, negative absorbances, transcription or calculation errors, legibility, etc.)
List results that fall outside the linear range of the KP instrument or the calibrated range of the AA or Cyanide Instrument, and were not reanalyzed. Were ICP linear ranges obtained within 3 months of, and preceding, the sample analyses? Yes (No) NA (From the ICP interelement corrections obtained within 12 months of, and preceding, the sample analyses? Yes (No) NA Were Instrument detection limits present, found to be less than or equal to the CRDL, and obtained within 3 monts of, and precede the sample analyses? Yes No NA (No) (Recease the sample results reported down to the IDL? Yes No Were sample weights, volumes, percent solids, and dilutions used correctly when reporting the results? Yes No COMMENTS AST C. I why I x 40 m L = U wy (F-1 limits)		·
List results that fall outside the linear range of the KP instrument or the calibrated range of the AA or Cyanide Instrument, and were not reanalyzed. Were ICP linear ranges obtained within 3 months of, and preceding, the sample analyses? Yes (No) NA (From the ICP interelement corrections obtained within 12 months of, and preceding, the sample analyses? Yes (No) NA Were Instrument detection limits present, found to be less than or equal to the CRDL, and obtained within 3 monts of, and precede the sample analyses? Yes No NA (No) (Recease the sample results reported down to the IDL? Yes No Were sample weights, volumes, percent solids, and dilutions used correctly when reporting the results? Yes No COMMENTS AST C. I why I x 40 m L = U wy (F-1 limits)		
List results that fall outside the linear range of the KP instrument or the calibrated range of the AA or Cyanide Instrument, and were not reanalyzed. Were ICP linear ranges obtained within 3 months of, and preceding, the sample analyses? Yes (No) NA (From the ICP interelement corrections obtained within 12 months of, and preceding, the sample analyses? Yes (No) NA Were Instrument detection limits present, found to be less than or equal to the CRDL, and obtained within 3 monts of, and precede the sample analyses? Yes No NA (No) (Recease the sample results reported down to the IDL? Yes No Were sample weights, volumes, percent solids, and dilutions used correctly when reporting the results? Yes No COMMENTS AST C. I why I x 40 m L = U wy (F-1 limits)		
Were ICP linear ranges obtained within 3 months of, and preceding, the sample analyses? - Yes (No) NA ANT (Frame Were ICP interelement corrections obtained within 12 months of, and preceding, the sample analyses? Yes (No) NA Were Instrument detection limits present, found to be less than or equal to the CRDL, and obtained within 3 monts of, and precede the sample analyses? Yes No NA ON TRLL > promise. Were all sample results reported down to the IDL? Yes No Were sample weights, volumes, percent solids, and dilutions used correctly when reporting the results? Yes No COMMENTS AST C. I was IL x 40 on L = U was IK.		· · · /
Were ICP linear ranges obtained within 3 months of, and preceding, the sample analyses? - Yes (No) NA ANT (Frame Were ICP interelement corrections obtained within 12 months of, and preceding, the sample analyses? Yes (No) NA Were Instrument detection limits present, found to be less than or equal to the CRDL, and obtained within 3 monts of, and precede the sample analyses? Yes No NA ON TRLL > promise. Were all sample results reported down to the IDL? Yes No Were sample weights, volumes, percent solids, and dilutions used correctly when reporting the results? Yes No COMMENTS AST C. I was IL x 40 on L = U was IK.		
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